

# **2006 VIRGINIA TOXICS RELEASE INVENTORY (TRI) REPORT**

**March 2008**

# **TRI**

**Summary of Data  
from 2006 Industry Reports**



## **DEQ MISSION AND PROGRAMS**

It is the policy of the Virginia Department of Environmental Quality to protect the environment of Virginia in order to promote the health and well-being of the Commonwealth's citizens. To this end, the Department implements numerous programs, as described on the Department's website at <http://www.deq.virginia.gov/programs/homepage.html>. These range from media programs on Air Quality, Water Quality, and Waste Management, to area programs (such as the Chesapeake Bay Program and the Virginia Coastal Program), to more specific programs (such as Small Business Assistance and Citizen Monitoring), and others too numerous to set out here. The Department is committed to pollution prevention and elimination or reduction of waste at the source of generation. Pollution prevention programs include the Virginia Environmental Excellence Program and Businesses for the Bay. All parts of the agency and other sectors of government, all Virginia businesses and industry, and all Virginia's citizens have a role in managing and controlling the release of toxic chemicals in the Commonwealth.

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## **Executive Summary**

# **2006 Virginia Toxics Release Inventory (TRI) Report**

*In March of each year, the Virginia Department of Environmental Quality (Department or DEQ) publishes the Virginia Toxics Release Inventory (TRI) Report, in accordance with Virginia Code § 10.1-1186.1. The Virginia TRI Report contains information on the release or other management of listed chemicals and chemical categories, as reported by Virginia industries in specified industrial sectors and by federal facilities located within the Commonwealth. The facilities' reports are required by Title III of the federal Superfund Amendment and Reauthorization Act (SARA Title III), also known as the Emergency Planning and Community Right-to-Know Act (EPCRA). The Virginia TRI Report is a multi-media report, covering air, water, and waste management activities, and it addresses a variety of handling practices, including releases, recycling, energy recovery, and on-site and off-site treatment and disposal.*

*This year's Virginia TRI report covers calendar year 2006, the most recent year for which data is available, and includes all reports and revisions received by the Department on or before February 21, 2008. For calendar year 2006, 467 Virginia facilities filed 1,786 individual reports on the release, transfer, or management of TRI chemicals or chemical categories. This was a 4.3% decrease from the 488 facilities and a 3.9% decrease from the 1,859 reports filed for calendar year 2005. In 2006, Virginia facilities reported the release, transfer, or management of 162 chemicals and chemical categories, out of the more than 650 chemicals and chemical categories that are subject to the TRI reporting requirements.*

*According to the reports, Virginia facilities reported the release, transfer, or on-site management of 769.5 million pounds of TRI chemicals during calendar year 2006 (a 29.4 % increase from 2005). Of this total:*

*66.3 million pounds of TRI chemicals were released on-site at reporting Virginia facilities (a 18.6% increase from 2005);*

*69.0 million pounds of TRI chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal (a 20.8% decrease from 2005) and;*

*634.2 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery (a 40.4 % increase from 2005).*

*Despite the overall increase in the total amount of release, transfer, or on-site management, there has been no significant increasing trend in the amount of TRI chemicals being released to the environment since the inception of the TRI Program. For calendar year 2006, the overall increase is attributed to two sources. One facility reported huge increases in recycling activities for on-site management. Another facility reported an increase in water release activity for a particular TRI chemical as compared to previous reporting years.*

*The Virginia TRI Report addresses separately those TRI chemicals that the U.S. Environmental Protection Agency (EPA) has designated as persistent bioaccumulative toxins (PBTs). These chemicals remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. According to the 2006 PBT reports:*

*389,153 pounds of PBT TRI chemicals were released on-site at reporting Virginia facilities;*

*3.1 million pounds of PBT TRI chemicals were transferred off-site from reporting Virginia facilities for treatment, recycling, energy recovery, or disposal; and*

*5,164 pounds of PBT TRI chemicals were managed on-site by treatment, recycling, or energy recovery.*

*Dioxins and dioxin-like compounds account for 41.9 grams (approximately 0.0923 pounds) of the PBT chemicals released, transferred, or managed by Virginia facilities during calendar year 2006.*

*As required by statute, the Virginia TRI Report also addresses industrial sectors (identified by standard industrial code), facilities, and facility location (jurisdiction). For calendar year 2006, three reporting industrial sectors account for 64.1% of the total on-site releases to the environment. These were: Utilities (electric, gas, and sanitary services); Chemical Manufacturing; and Paper Manufacturing. The text of the report details further information about the industrial sectors, facilities, and jurisdictions with the largest reported on-site release, on-site management and other management of TRI chemicals.*

*The Virginia TRI Report provides the public with information concerning specified toxic chemicals and chemical compounds that are manufactured, processed, or otherwise used at Virginia facilities. Responsible use of this information can help both the public and industry identify potential concerns and develop effective strategies for reducing toxic chemical usage and release. However, the TRI data does not represent a measure of the public's exposure to chemicals, nor does it assess risk. Many of the releases are regulated and permitted under other state and federal programs that are designed to protect human health and the environment. Because of differences in report generation schedules and receipt of reports, the information in the Virginia TRI Report will not precisely match the information in the national Toxics Release Inventory - Public Data Release, as published by EPA.*

# **Introduction**

## **Part One - Virginia TRI Reporting**

### **Statutory and Regulatory Basis**

The Virginia Toxics Release Inventory (TRI) Report is published annually pursuant to Virginia Code § 10.1-1186.1 (see Appendix A). It contains information on the release, transfer, or management of listed chemicals and chemical categories, as reported by over 400 Virginia industries and federal facilities. The facilities are required to submit their reports pursuant to the federal Emergency Planning and Community Right-to-Know Act (EPCRA), also known as SARA Title III.<sup>1</sup> The Virginia Code § 10.1-1186.1 directs the Virginia Department of Environmental Quality (the Department or DEQ) to publish the Virginia TRI Report in March of each year and to include information for the most recent calendar year for which data are available - in this case, calendar year 2006. The Virginia Code also directs that the report be organized by chemical, facility, facility location, and standard industrial classification (SIC) code. Federal regulations require facilities to submit their TRI reports both to the U.S. Environmental Protection Agency (EPA) and to the Commonwealth. The Virginia TRI Report is compiled directly from the reports received from Virginia facilities.

A Glossary of Terms used in this report is included as Appendix B.

### **Current Year (2006) Virginia Facility Reports**

Under the federal requirements, facilities are required to submit their reports for a calendar year by the following July 1 - for example, facilities were required to file their reports on their calendar year 2006 activities on or before July 1, 2007. Therefore, data for calendar year 2006 are the most recent available for this March 2008 report. This year's Virginia TRI Report includes all facility reports and revisions received by the Department on or before February 21, 2008. To improve the accuracy of reported data the Department included reports received through February 21, 2008. For reporting year 2006, 467 Virginia facilities filed 1,786 individual reports on the release or other management of TRI chemicals or chemical categories. This was a slight decrease from the 488 facilities and 1,859 reports that were filed for reporting year 2005. Data for all reporting years are available to the public from the DEQ's SARA Title III office. This report and its attachments are also available to the public on DEQ's website at (<http://www.deq.virginia.gov/sara3/313.html>).

In 2006, Virginia facilities reported the release, transfer, or management of 162 of the more than 650 chemicals and chemical categories that are subject to the TRI.

### **Improvements to the 2006 Virginia TRI Report**

Continuing the policy changes begun with the 2002 report, this year's TRI report contains additional information based on the recent North American Industry Classification System (NAICS) code ruling by EPA. Assessing risk is beyond the scope of this report and is subject to site-specific interpretations and

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<sup>1</sup> 42 U.S.C. § 11023, or SARA § 313

calculations. Readers are encouraged to utilize the resources listed in this report, its appendices, and other data to analyze the overall use, release, and management, and health hazard of TRI chemicals.

Virginia is one of fourteen states participating in the State Data Exchange program for online data collection of TRI reports. For RY2006, Virginia participated in Stage 2 of the TRI central data exchange (CDX). States that join the TRI State Data Exchange can now save resources by getting their data set electronically via CDX. This includes data that is submitted to EPA on diskette or paper or by a first time CDX filer.

## **Part Two - National Toxics Release Inventory Reporting Program**

### **The National Toxics Release Inventory**

The Virginia TRI Report is compiled directly from reports that Virginia facilities submit under federal law and regulations.<sup>2</sup> Using those same authorities, EPA compiles and maintains nationwide information in its *Toxics Release Inventory - Public Data Release*, which is available to the public on EPA's website at (<http://www.epa.gov/tri/>). The National Toxics Release Inventory was established to provide information to the public about the presence and release of toxic and hazardous chemicals in their communities. From inception, the national TRI program and Virginia's program have been expanding and evolving to meet the needs of an informed public. A list of supplementary resources on the program can be found in Appendix C, and more detailed information about the historical changes to the TRI program can be found in Chapter Four and in Appendix D.

### **Facilities That Must Report**

Under the national TRI program, a facility must submit a TRI report (or reports) to EPA and the state if:

- 1) It has ten or more full-time employees** (a combined total for all employees of 20,000 hours or more for the year);
- 2) The facility's primary business is within one of the covered North American Industrial Classification System (NAICS) codes.** The industry sectors include metal mining, coal mining, paper and allied products, chemicals and allied products, petroleum terminals and bulk stations, and others. The complete list of covered industry groups is provided in Appendix E; and
- 3) The facility manufactured, processed, or otherwise used a reportable toxic chemical in quantities greater than the established threshold during the course of a calendar year.** The annual thresholds for non-PBT chemicals are 25,000 pounds for manufacturing, 25,000 pounds for processing, and 10,000 pounds for "otherwise use" of a TRI chemical. For PBT chemicals, the thresholds are lower. For example, dioxin and dioxin-like compounds have a threshold of 0.1 gram, and lead and lead compounds have a threshold of 100 pounds. For PBT chemicals, these lower

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<sup>2</sup> The national TRI was established under Title III, Section 313, of the Federal Superfund Amendments and Reauthorization Act (SARA), which is also known as the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), 42 U.S.C § 11023. The related federal regulations are found at 40 CFR Part 372.

reporting thresholds apply whether the chemical is manufactured, processed, or otherwise used. The definitions of "manufactured," "processed," and "otherwise use" can be found in the Glossary of Terms (Appendix B).

Federal facilities are also required to comply with EPCRA and the Pollution Prevention Act (PPA) of 1990, in accordance with Executive Order 13148. That Executive Order requires all federal facilities that manufacture, process, or otherwise use any listed EPCRA Section 313 chemical above the reporting threshold to submit a TRI report. The first federal facility reports were submitted on or before July 1, 1995, for calendar year 1994.

### **Chemicals and Chemical Categories**

For a chemical or chemical category to remain on or be added to the TRI list, it must be known to cause or to reasonably be anticipated to cause one of the following:

- adverse acute health effects at significant concentration levels beyond facility boundaries as a result of continuous or frequently occurring releases;
- cancer in humans; or
- a significant adverse effect on the environment because of its toxicity and persistence in the environment.

As new chemicals of concern are identified, they are added to the TRI list. Conversely, if TRI chemicals are found not to meet the toxicity requirements, they can be deleted. Currently, the reportable TRI chemical list contains over 650 chemicals and chemical categories. A complete list of TRI chemicals and chemical categories for calendar year 2006 reports can be found in the EPA publication "The Emergency Planning and Community Right-to-Know Act - Section 313 Release and other Waste Management Reporting Requirements" (EPA260/K-01-001, February, 2001). The publication can be found online at: [http://www.epa.gov/tri/guide\\_docs/pdf/2000/brochure2000.pdf](http://www.epa.gov/tri/guide_docs/pdf/2000/brochure2000.pdf). As noted, for 2006 Virginia facilities reported the release, transfer, or management of 162 of the more than 650 chemicals and chemical categories that are subject to the TRI.

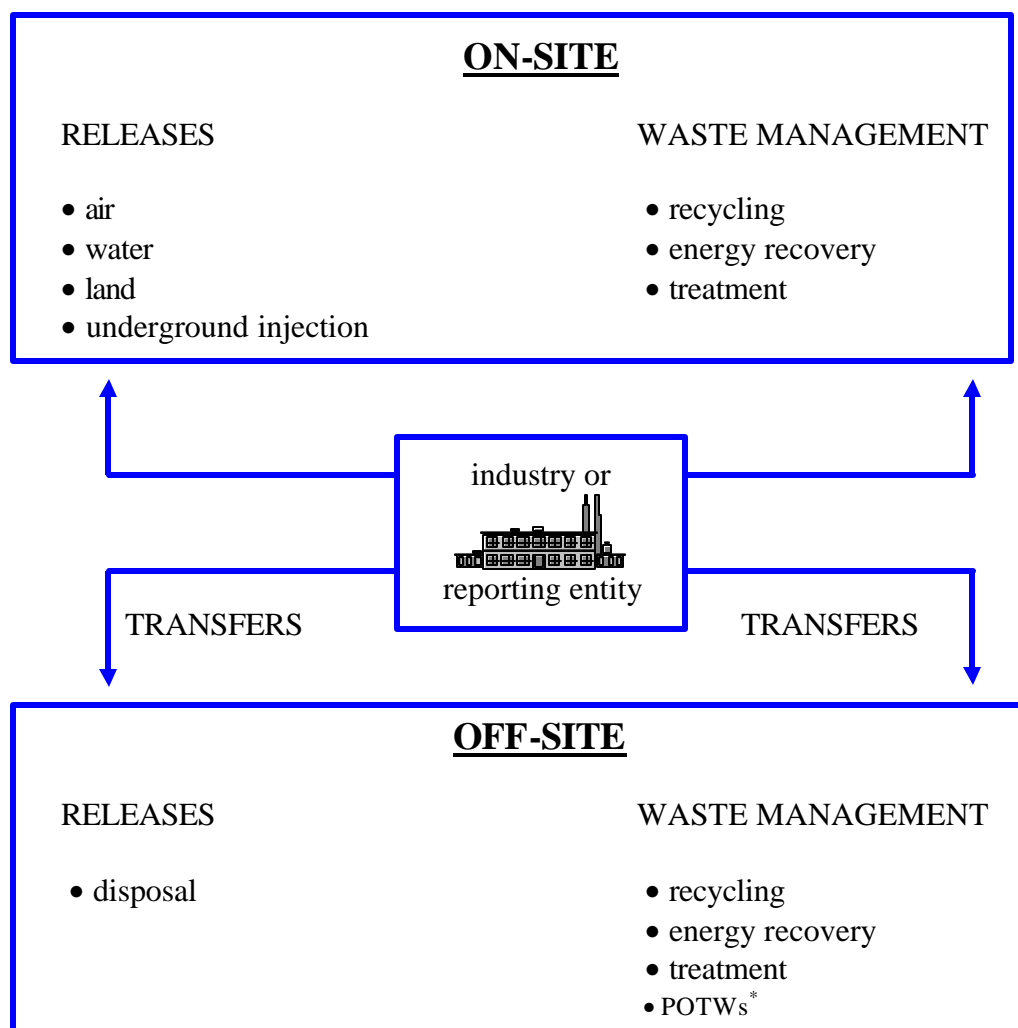
### **Reporting Forms and Activities That Must Be Reported**

Each year, reporting facilities submit one reporting form for each TRI chemical or chemical category that is manufactured, processed, or otherwise used in amounts equal to or greater than the threshold values. For each TRI chemical or chemical category, facilities must submit either a Form A (simplified form) or a Form R (long form). Examples of both forms are in Appendix F. Form A has restrictions governing its use. The TRI Burden Reduction Rule, announced on December 18, 2006, expanded the eligibility for use of Form A. A facility can use Form A if the facility's total manufactured, processed, and/or otherwise use amounts do not exceed one million pounds. The alternate threshold rule now allows the use of Form A for PBT chemicals except for Dioxins. However Form A may be used if the PBT chemical released or disposal to the environment does not exceed 500 pounds for recycling, energy recovery, and treatment.

Data used to prepare quantitative information in the Virginia TRI Report come principally from Part II of the Form R reports, and specifically from Sections 5, 6, 7, and 8 of Part II, Form R. These sections are referred to throughout the Virginia TRI Report and are described below:

- **Section 5: Quantity of toxic chemical entering/releasing to each environmental medium on-site.** Release reporting is broken down into categories: releases to the air (from stack and fugitive emissions), releases to water (onsite and to publicly owned treatment works (POTWs)), and releases to land (underground injection, disposal to land, RCRA Subtitle C landfill, other landfills, land treatment/application farming, surface impoundment, or other disposal).
- **Section 6: Transfers of the toxic chemical in wastes to off-site locations.** Section 6 contains two main subsections: transfers to POTWs, and transfers to all other off-site locations (in-state or out-of state). Facilities are required to provide the name and location of off-site locations, the quantity transferred, and the method of management (treated, disposed, recycled, or burned for energy recovery).
- **Section 7: On-site waste treatment methods and efficiency (including energy recovery processes and recycling processes).** Facilities are asked to provide mostly qualitative information on the on-site treatment processes, the estimated range of influent concentration, and the efficiency of the operation.
- **Section 8: Source reduction and recycling activities.** Section 8 was added to the Form R reporting as a result of the federal Pollution Prevention Act in 1990 to track production-related activities. Section 8 extracts and re-aggregates data reported in Sections 5 through 7 into environmental releases (production-related on-site and off-site releases), off-site transfers/management, and on-site management. Where Section 7 contains qualitative information about on-site management practices, a subsection of Section 8 asks for related quantitative data. Section 8 and its subsections also request previous-year reporting and future year estimates for production-related releases, transfers for off-site management, and on-site management. Other subsections of Section 8 ask for episodic/catastrophic releases (non-production related), qualitative information on source reduction activities, and a production ratio or activity index to better engage the facility's efforts in source reduction.

The flow chart (Figure 1) shown below illustrates the information collected on Form R for TRI chemicals:

**Figure 1 - Schematic Diagram of the TRI Data Collected**

### **Part Three - Uses and Limitations of TRI Data**

The Virginia TRI Report provides the public with information concerning designated toxic chemicals and chemical categories manufactured, processed, or otherwise used at facilities, including the amounts released to the environment and managed as wastes. Responsible use of this information can enable the public to identify potential concerns, and to work with industry and government to reduce toxic chemical releases and the risks associated with such releases.

Industry can use the data to: obtain an overview of use and release of toxic chemicals, identify and reduce costs associated with toxic waste, identify promising areas for pollution prevention, establish reduction targets, and measure and document progress toward reduction goals.

\* Publicly Owned Treatment Works

The public availability of the data has assisted many facilities in working with their communities to develop effective strategies for reducing environmental and human health risks that may result from toxic chemical releases. Although the data for calendar year 2006 shows an increase (29.4%) in the amounts released on-site, transferred off-site, and managed on-site over 2005 (see Chapter 4), since the TRI Program's inception in 1988, there has been a historic downward trend in the amount of TRI chemicals released to the environment and managed as wastes,.

Nevertheless, there are limitations on the use of TRI data:

1. The TRI report contains reported information on the quantities of chemicals released and managed, not the public's exposure to or risk from the chemicals. Risk to human health by a chemical release depends on the toxicity of the chemical, how it disperses, reacts, or persists in the environment; and the quantity, concentration, and type of human exposure. Furthermore, chemicals reported for the TRI report are not weighted by their toxicity. For example, a pound of one substance may be more toxic or hazardous than 1,000 pounds of another. Due to the limited nature of TRI data collected, readers are strongly discouraged from making any health or environmental risk/exposure assessments from the information presented. Many of the TRI chemical releases are permitted under other federal and state regulatory programs; therefore, data from these regulatory programs should provide additional information to better inform citizens about their environment.
2. The TRI program captures only a portion of all toxic chemical releases in Virginia. It does not account for TRI chemicals from most non-manufacturing facilities, facilities with fewer than 10 employees, facilities that do not meet the chemical quantity thresholds, other non-industrial sources, and transportation-related emissions.
3. The majority of facilities report TRI data based on estimates. The TRI program does not require that they monitor releases, only that they use best available data. Using different methods to estimate data can result in significant variability from one facility to another, as well as from one year to the next.
4. Patterns of releases and other waste management activities can change significantly from one year to the next. Thus, the data in this report for a specific facility may be different from those reported for a prior year.
5. Direct comparison between figures in this report and figures in past Virginia Toxics Release Inventory (TRI) Summary Reports is discouraged because of changes in reporting requirements and the authorized incorporation of revisions to previous years' data. Several historical comparisons, with appropriate standardization of data, are provided in Chapter 4 and Appendix G of this report.
6. EPA is required by law to compile an annual *Toxics Release Inventory - Public Data Release* on the national level. It is anticipated that the data published in the Virginia TRI Report will not completely correspond to the data published by the EPA. Contributing factors include: differing dates on which data are extracted for processing, revised facility reports, and facilities that mistakenly report to the Commonwealth or EPA but not both. The Department and EPA continue to work together to rectify such differences.

## **Chapter One - 2006 Virginia TRI Data Review**

Chapter One describes the 2006 reporting year data in its entirety, based on the type of activity and the chemicals and chemical categories reported. The chapter is divided into four parts. Part One presents an overview and summary of 2006 data collected. Part Two discusses on-site releases of TRI chemicals to the environment, whether to air, water, or land. These data are derived from Section 5 of the Form R reports. Part Three of Chapter One discusses the off-site transfers of TRI chemicals, whether to POTWs or to other off-site locations. These data are derived from Section 6 of the Form R reports. Part Four of Chapter One discusses on-site and off-site management activities. These data are derived from Section 8 of the Form R reports. While this chapter includes all TRI chemicals, Chapter Two addresses persistent bioaccumulative toxic (PBT) chemicals in more detail.

As described in the Introduction, Section 8 of the federal Form R asks facilities to extract and re-aggregate certain data from Sections 5 and 6. To avoid double-counting these chemicals in the Overview and Summary, only data that are independent of Sections 5 and 6 are presented when discussing "On-Site Management" in Part One of this chapter. When discussing Section 8 data as a whole, however, in Part Four of this chapter, all Section 8 data are used, including data extracted and re-aggregated from Sections 5 and 6, so that the balance between various on-site and off-site management activities can be shown.

Appendices H and I contain facility-specific information, arranged by jurisdiction, for TRI chemicals (excluding PBTs) and for PBT chemicals, respectively.

### **Part One - 2006 Overview and Summary**

For calendar year 2006, Virginia facilities reported that they released, transferred, or managed over 769.5 million pounds of TRI chemicals (see Table 1).

Approximately 66.3 million pounds of TRI chemicals were reported to have been released on-site to the environment. Air releases represented 42.0 million pounds, or 63.2 % of all the TRI chemicals released on-site in 2006. Releases to the water totaled approximately 19.5 million pounds, or 29.4% of the total released on-site. Releases to the land totaled approximately 4.9 million pounds, or 7.4% of the total released on-site. For 2006, the amount of TRI chemical releases to the environment represented approximately 8.6% of the total TRI chemicals.

Off-site transfers totaled approximately 69.0 million pounds of TRI chemicals. Off-site transfers to POTWs totaled approximately 11.8 million pounds. Off-site transfers to other (non-POTW) facilities (for treatment, recycling, energy recovery and disposal) totaled approximately 57.2 million pounds. For 2006, the amount of TRI chemicals transferred off-site represented approximately 9.0% of the total for TRI chemicals by this measure.

Facilities reported that approximately 634.2 million pounds of TRI chemicals were managed on-site by treatment, recycling, or energy recovery. For 2006, this amount of chemicals managed onsite represents approximately 82.4% of the total TRI Chemicals.

**Table 1. Summary of Data by Type of Release, Transfer, and On-Site Management for TRI Chemicals (in pounds per year)**

ON-SITE RELEASES BY MEDIA (Section 5 of Form R)	
Total Air	41,953,491
Fugitive Air	3,760,852
Stack Air	38,192,639
Total Water	19,458,570
Total Land	4,913,971
Landfills	3,310,824
Land Treatment / Application	4,009
Surface Impoundment	1,293,667
Other Disposal	305,471
<b>Total On-Site Releases to Media</b>	<b>66,326,032</b>

OFF-SITE TRANSFERS BY TYPE (Section 6 of Form R)	
Publicly Owned Treatment Works (POTWs) (includes metals and metal compounds)	11,824,256
Total Other Off-Site Transfers	57,185,726
Off-Site Transfers for Recycling	24,311,600
Off-Site Transfers for Energy Recovery	11,641,578
Off-Site Transfers for Other Treatment	12,864,538
Off-Site Transfers for Disposal	8,368,010
<b>Total Off-Site Transfers</b>	<b>69,009,982</b>

ON-SITE MANAGEMENT (From Section 8 of Form R) *	
Treated On-Site	167,777,050
Recycled On-Site	441,619,821
Energy Recovery On-Site	24,771,860
<b>Total On-Site Management</b>	<b>634,168,731</b>

Total TRI Chemicals Released On-site, Transferred Off-site, or Managed On-site by Reporting Facilities	<b>769,504,745</b>
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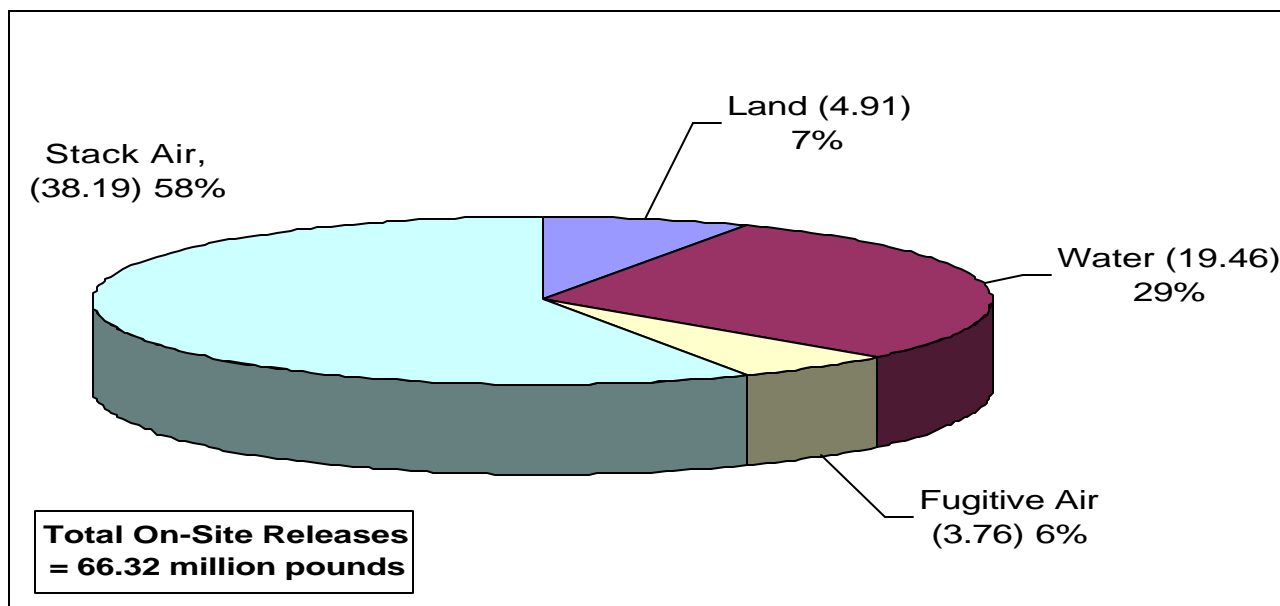
\* The data for the on-site management of TRI chemicals is a summary of data collected from Part II, Sections 8.2, 8.4, and 8.6 of the Form R. These sections, in turn, are quantitative data not reported anywhere else in the Form R and reflect on the descriptive data reported in Part II, Section 7 (on-site management practices - treatment, energy recovery, and recycling) of the Form R. Data extracted and re-aggregated to Section 8 from Sections 5 and 6 of Form R have not been included here, to avoid duplicate counting.

**Part Two - On-Site Releases to the Environment**

Part Two of this Chapter discusses the on-site releases of TRI chemicals to the environment by facilities, as reported in Section 5 of the TRI Form R. The quantities reported in Section 5 include production-related releases, any catastrophic releases or one-time events not associated with routine production processes.

A release refers to an on-site discharge of TRI chemicals to the air, water, land, and/or disposal in underground injection wells. Any reductions in waste achieved by on-site treatment methods are taken into account when facilities determine their release data. Approximately 66.3 million pounds of TRI chemicals were reported as released into the environment by reporting facilities for reporting year 2006.

**Figure 2. On-Site Releases of TRI Chemicals to All Media for Reporting Year 2006** (from Section 5 of Form R. The number inside the parentheses is the quantity of releases in each category in millions of pounds, and the percent figure is the percent of total on-site releases.) There were no underground injection releases reported in 2006.

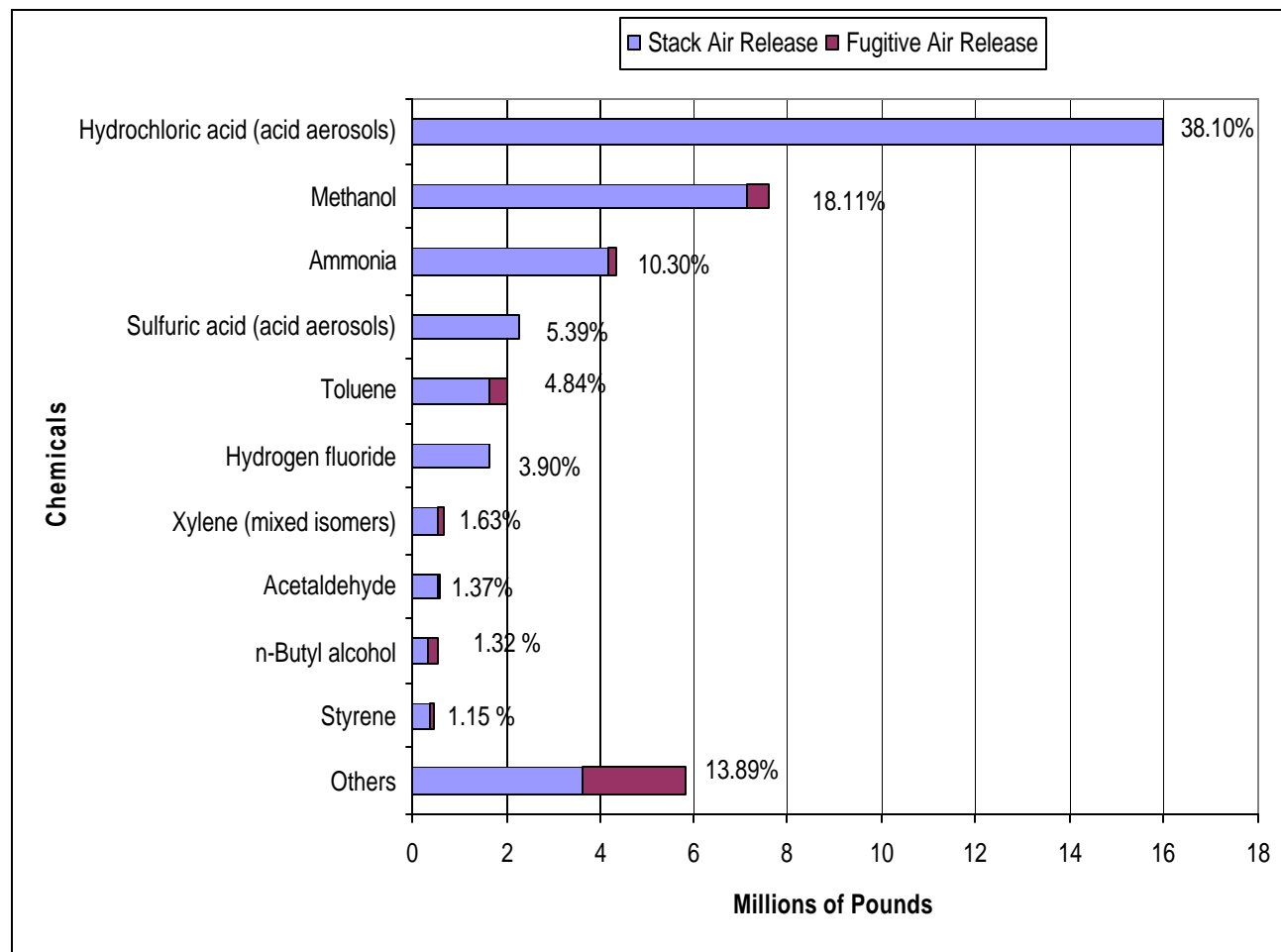
**On-Site Releases to the Air**

On-site air releases are classified as either “fugitive” (non-point source) or “stack” (point source) air emissions. Examples of fugitive air emissions are equipment leaks from valves, pump seals, flanges, compressors, sampling connections, open-ended lines, and evaporative losses from surface impoundments and spills. Stack air emissions are releases to the air that are conveyed through stacks, ducts, pipes, vents, or other confined air streams. Most, if not all, facilities reporting to TRI have permitted stack air emissions.

Based on the amount of fugitive and stack emissions reported, total air release of all TRI chemicals was 42.0 million pounds, which accounted for 63.2% of the total on-site releases to all media (air, water, and land). The top ten TRI chemicals released to the air made up approximately 86.1% of the total reported TRI air emissions in 2006 (See Figure 3). The top ten TRI chemicals released to the air in Virginia

were: hydrochloric acid, methanol, ammonia, sulfuric acid, toluene, hydrogen fluoride, xylene (mixed isomers), acetaldehyde, n-butyl alcohol and styrene. Acid aerosols such as hydrochloric acid, sulfuric acid, and hydrogen fluoride were mainly generated during the combustion of coal or oil. Electric power generating facilities, in particular, contributed to the emissions of acid aerosols. Methanol, ammonia, and toluene continued to be the significant air pollutants generated from the manufacturing sector.

**Figure 3. Top Ten TRI Chemicals Released to the Air On-Site in 2006** (from Section 5 of Form R. The number next to each bar is the % of total air releases for all 2006 chemicals reported.)

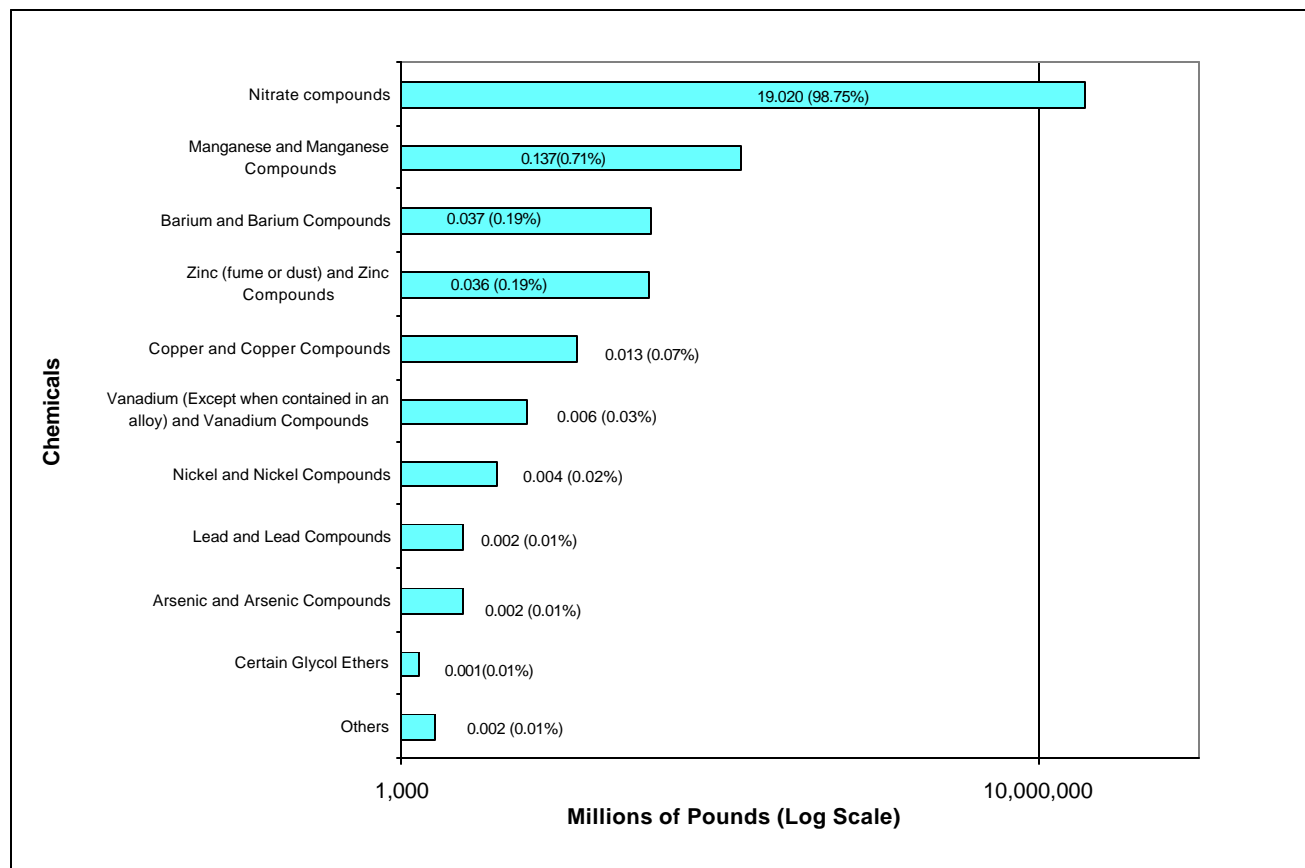


### On-Site Releases to Water

On-site releases to water include discharges to surface waters, such as rivers, lakes, ponds, and streams. Reported on-site releases of TRI chemicals to water in 2006 totaled 19.5 million pounds and accounted for 29.3% of all on-site releases to the air, water, and land in 2006. Ten chemicals and chemical categories accounted for more than 99.9% of the on-site TRI chemical releases to the water. The top ten TRI chemicals released to water were: nitrate compounds (98.7% of total releases to water), manganese and manganese compounds, barium and barium compounds, zinc and zinc compounds, copper and copper compounds, vanadium, nickel and nickel compounds, lead and lead compounds, arsenic and

arsenic compounds, and certain glycol ethers. Nitrate compounds are a common byproduct of industrial wastewater treatment processes and have consistently been reported as the major chemical released to the surface water. Nitrates can pose a nutrient problem to water bodies.

**Figure 4. Top Ten TRI Chemicals Released to Water On-Site in 2006** (from Section 5 of Form R.) The information presented here is in logarithmic, base 10 scale, which compresses the bar chart to show up to 840-fold magnitudes of difference between **nitrate compounds and other chemicals**. Please note the scale mark of 1.000 means 1 million pounds, the scale mark of 0.100 means 0.1 million pounds, etc. The number by the bars represents the quantity in millions of pounds followed by percent of total reported releases to water.



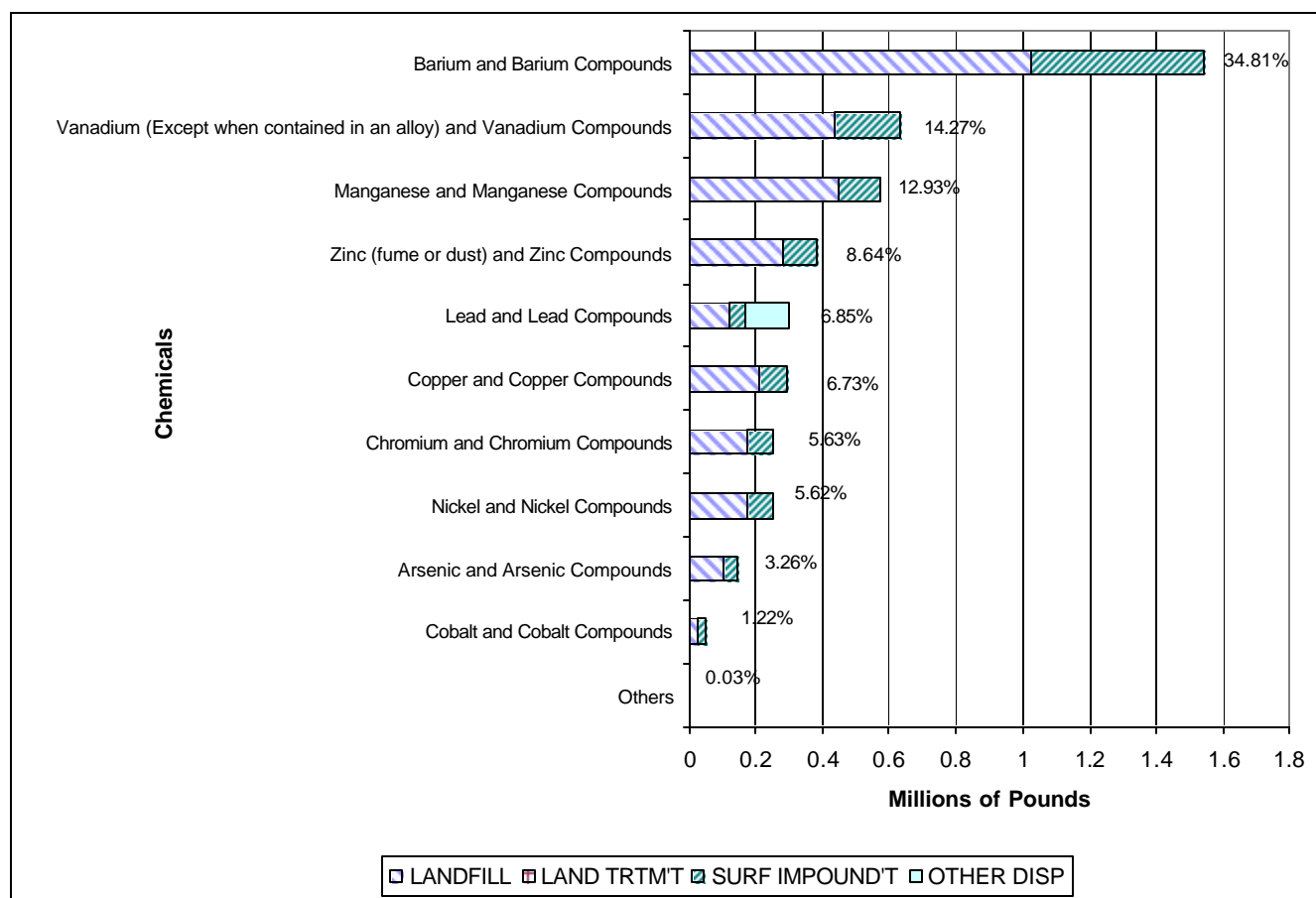
### On-Site Releases to the Land

On-site releases to the land refer to landfilling, surface impoundment, land treatment/application farming, or any other release of a TRI chemical to land within the boundaries of a facility. Virginia does not permit underground injection as a method of hazardous waste disposal, and no underground injection or RCRA Subtitle C-permitted land disposal of TRI chemicals was reported in 2006.

The total amount of TRI chemicals released to the land in Virginia during 2006 was 4.9 million pounds. That accounted for 7.4 % of all reported on-site TRI releases (releases to the air, water, and land). The top ten TRI chemicals constituted approximately 99.9% of all of the TRI chemicals released to the land. They were: barium and barium compounds, vanadium and vanadium compounds, manganese and manganese compounds, zinc and zinc compounds, lead and lead compounds, copper and copper compounds, chromium and chromium compounds, nickel and nickel compounds, arsenic and arsenic

compounds, and cobalt and cobalt compounds (Figure 5). Metals and metal compounds such as barium are found naturally in coal combusted for energy generation and in the ashes remaining after combustion of the coal.

**Figure 5. Top Ten TRI Chemicals Released On-Site to the Land in 2006** (from Section 5 of Form R. The number next to each bar is the % of total on-site land releases for all 2006 chemicals reported.)



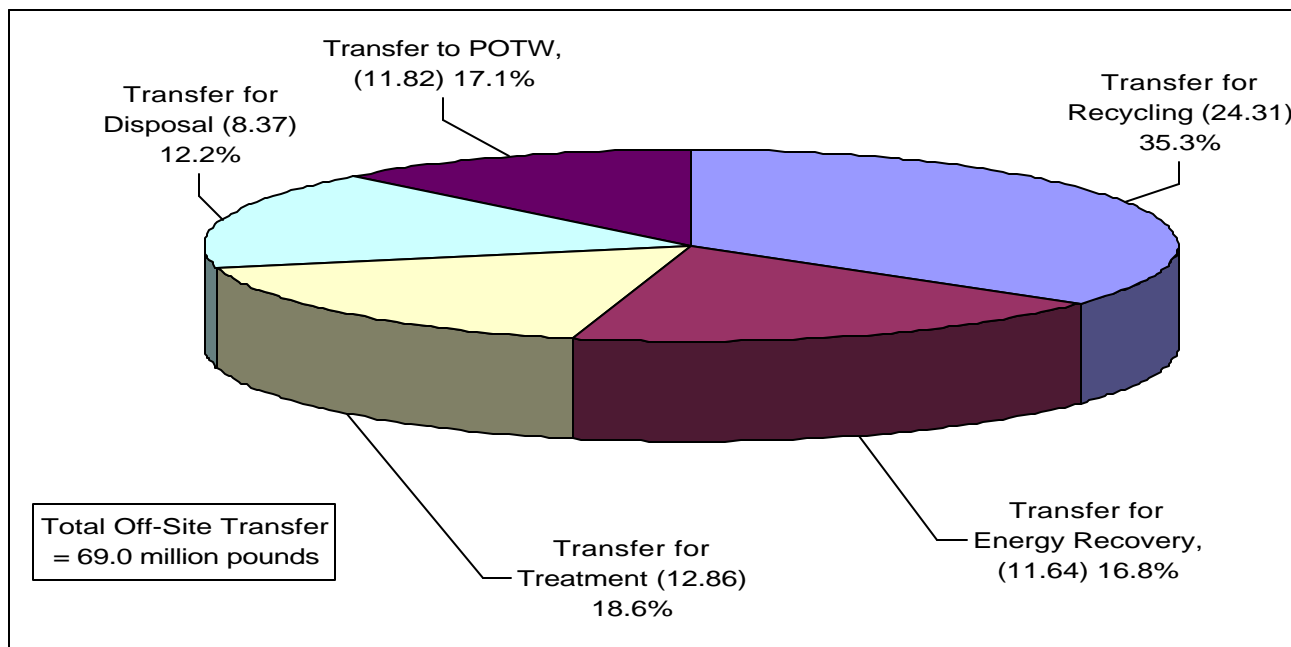
### Part Three - Off-Site Transfers

Transfers refer to TRI chemicals sent off-site. Transfers are reported as transfers to POTWs or other off-site destinations, such as incinerators, landfills, or other facilities for treatment, recycling, energy recovery, or disposal that are not part of the reporting facility.

In this section, data was collected from Section 6 of Form R. For 2006, 69.0 million pounds of TRI chemicals were reported as sent off-site for further management or disposal.

**Figure 6. All Off-Site Transfers of TRI Chemicals for Reporting Year 2006**

(from Section 6 of Form R. The number inside the parentheses is the quantity of transfers in each category in millions of pounds and the percent figure is the percent of total transfers.)

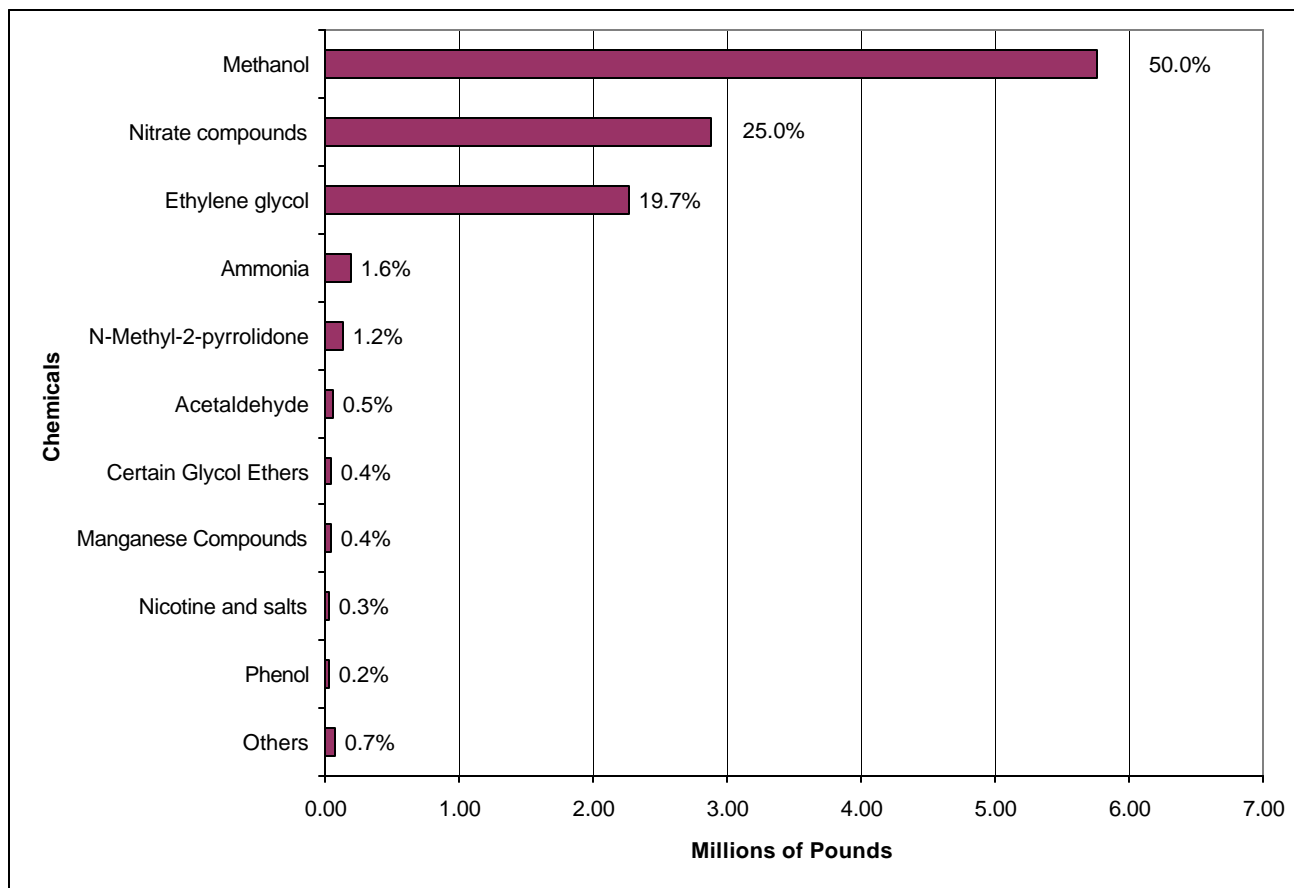


### Transfers to Publicly Owned Treatment Works (POTWs)

A POTW is a wastewater treatment facility that is owned by a state or local government. Wastewater from facilities reporting under TRI is transferred through pipes or sewers to the POTW. The TRI information summarized below reports transfers of a chemical to a POTW; however, this is not necessarily the same as the release of a chemical to the environment. TRI chemicals may be treated, destroyed, and/or removed from the environment in a POTW's physical, chemical, and biological treatment processes. Some TRI chemicals are almost completely destroyed by a POTW. However, not all chemicals can be treated or removed by a POTW. Some chemicals such as metals and metal compounds may be removed but not destroyed. These may ultimately be disposed of in a permitted landfill, disposed of in a permitted land application process, or released through a permitted discharge to receiving waters.

Ten TRI chemicals accounted for approximately 99.3% or 11.7 million pounds of the total 11.8 million pounds of TRI chemicals transferred to POTWs in reporting year 2006. Methanol was the leading pollutant discharged to POTWs for treatment for this reporting period. The remaining top nine TRI chemicals transferred to POTWs in 2006 were: nitrate compounds, ethylene glycol, ammonia, n-methyl-2-pyrrolidone, acetaldehyde, certain glycol ethers, manganese compound, nicotine and salts, and phenol.

**Figure 7. Top Ten TRI Chemicals Transferred to Publicly Owned Treatment Works (POTWs) in 2006** (from Section 6.1 of the Form R. The number next to each bar is the % of total transfers to POTW)

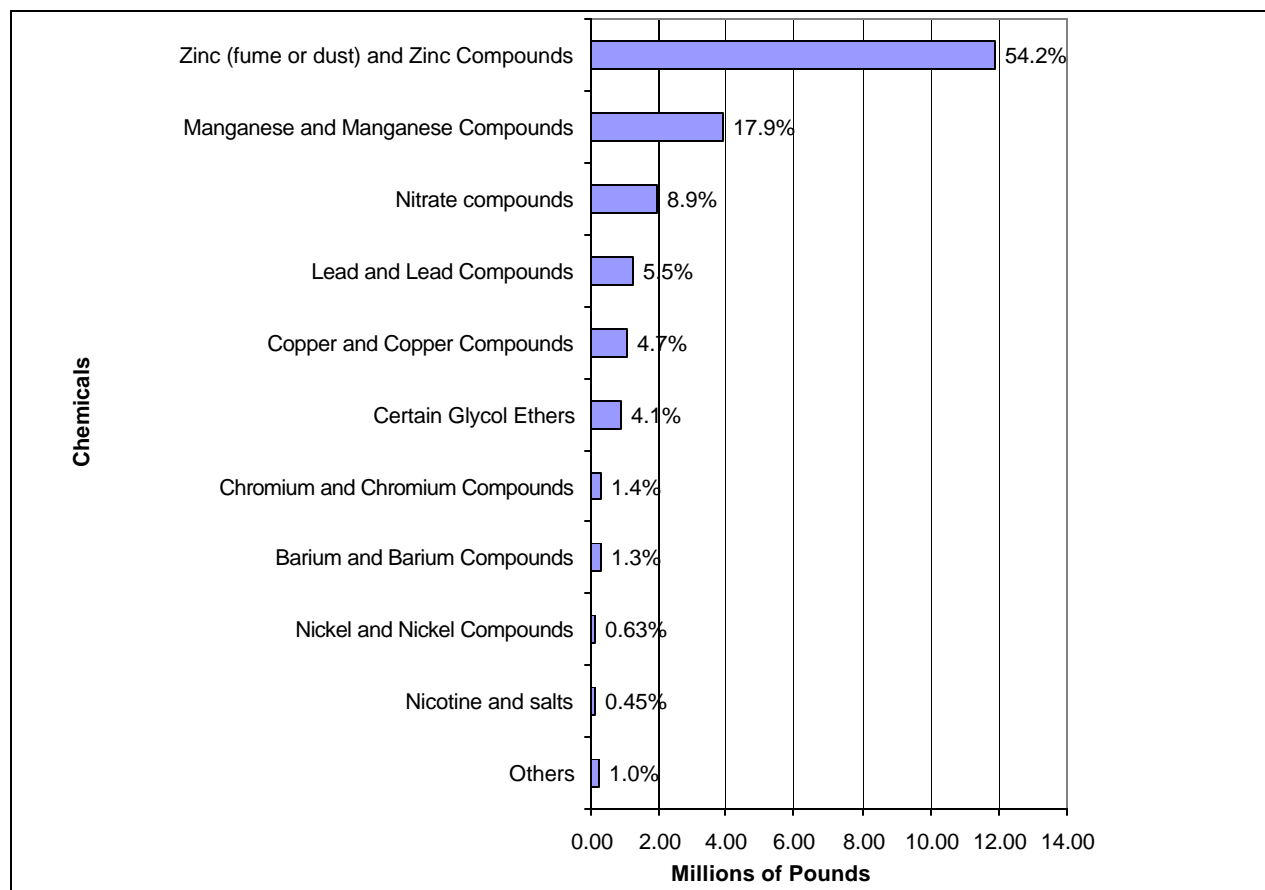


### Transfers to Other Off-Site Locations

The Form R also reports the transfers of TRI chemicals to facilities other than POTWs. These off-site locations include incinerators, landfills, and other treatment, energy recovery, recycling, and/or disposal facilities. Off-site transfers can be to facilities located inside or outside of the Commonwealth.

In 2006 the total amount of TRI chemicals transferred to other off-site locations was approximately 57.2 million pounds. Ten TRI chemicals represented approximately 99.1% of the total TRI chemicals transferred off-site to locations other than POTWs. The top ten TRI chemicals and chemical categories transferred off-site to locations other than POTWs in 2006 were: zinc and zinc compounds, manganese and manganese compounds, nitrate compounds, lead and lead compounds, copper and copper compounds, certain glycol ethers, chromium and chromium compounds, barium and barium compounds, nickel and nickel compounds, nicotine and nicotine salts.

**Figure 8. Top Ten TRI Chemicals Transferred to Off-Site Locations Other than POTWs in 2006**  
(from Section 6.2 of the Form R. The number next to each bar is the % of total transfers to other off-site locations)



#### Part Four - On-Site and Off-Site Management

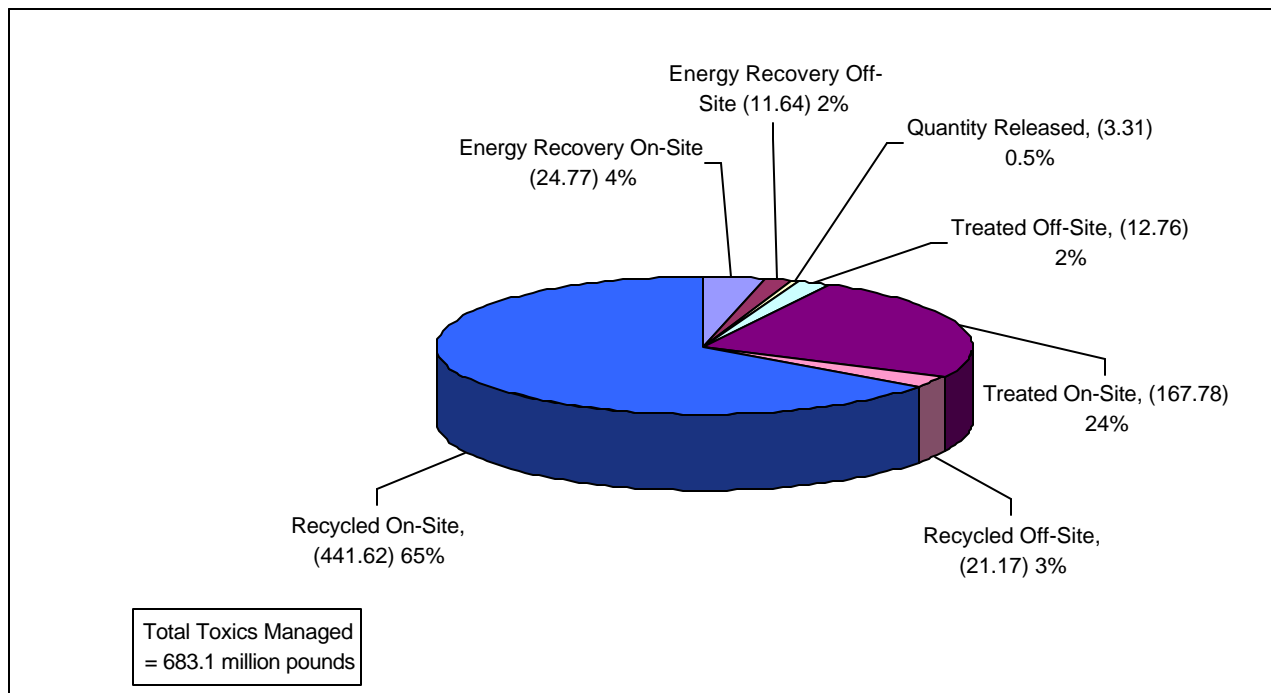
Under the Pollution Prevention Act of 1990, facilities subject to EPCRA Section 313 must report their source reduction and recycling activities. Consequently, EPA added Section 8 to the Form R to track production-related activities. Section 8 contains 11 subsections and requires facilities to extract and re-aggregate data reported in Sections 5 through 7 into releases (on- and off-site releases to the environment); off-site transfers/management; and on-site management categories. This part of Chapter One discusses all Section 8 data, so that the relative methods of toxic chemical management can be compared.

Some of the data and information reported in Sections 5, 6, and 7 are handled differently for Section 8 reporting. The differences are that the releases-to-the-environment data in Section 8 exclude catastrophic releases and one-time events not associated with the production process. Furthermore, metal and metal compounds reported as transfers for off-site management in Section 6 are aggregated with the on-site release data from Section 5 as releases to the environment. Metal and metal compounds cannot be destroyed through treatment; hence, their final disposal is considered a release to the environment. There are other differences in how quantities are reported, so that the total toxics managed, as reported in Section 8, does not precisely match the total in Table 1. Also, Section 8 is the only part of the Form R that contains quantitative data on on-site waste management activities other than releases. While Section 7 contains qualitative information about on-site management practices, a subsection of Section 8 asks for quantitative data related to information reported in Section 7.

Consistent with the pollution prevention goal, Section 8 of Form R and its subsections also report additional information that addresses resource reduction efforts. In general, facilities utilize several options to manage TRI chemicals. Treatment of waste, both on-site and off-site, involves a variety of methods, including biological treatment, neutralization, incineration, and physical separation. Another option is on-site or off-site recycling. This involves the toxic chemicals in wastes being recovered or reclaimed and being returned for further processing or being made available for use in commerce. Energy recovery involves the combustion of toxic chemicals in industrial furnaces or boilers that generate energy for on-site or off-site use. The least preferable and last management option is disposal, which is considered a release to the environment.

As reported in Section 8 of the 2006 facility reports, 683.1 million pounds of production-related TRI chemicals were released, treated, recycled, or recovered both on-site and off-site from Virginia facilities (Figure 9). Approximately 82.4% of the TRI chemicals were managed on-site and 8.6% of the TRI chemicals were released into the environment on-site. About 9.0% of the TRI chemicals were transferred off-site to be managed by various means.

**Figure 9. 2006 Management of TRI Chemicals** (from Section 8 of Form R. The number inside the parentheses is the quantity of TRI chemicals handled by each management option in millions of pounds and the percent value is the percent of the option to the total TRI chemicals managed by all options.)



Comparison between Table 1 and Figure 9 is discouraged. Table 1 contains data extracted from Sections 5, 6, and a portion of Section 8 of the TRI reports while Figure 9 is a compilation of data reported only in Section 8. Differences in the reporting are explained above. Because of these differences, the totals for Table 1 and Figure 9 do not precisely match.

## Chapter Two - 2006 TRI Data for PBT Chemicals

PBT chemicals are those that remain in the environment for long periods of time, are not readily destroyed, and build up or accumulate in body tissue. Because of these attributes, beginning with reporting year 2000, EPA added several PBT chemicals to the TRI reporting list, and it lowered the reporting thresholds for 18 PBT chemicals and chemical categories. Beginning with reporting year 2001, lead and lead compounds were added to the PBT list, and their thresholds lowered to 100 pounds per year. Previously, lead and lead compounds had been treated as non-PBT chemicals.

For reporting year 2006, the Department received 336 reports and revisions for PBT chemicals, out of a total of 1786 TRI reports and revisions (19%). Table 2 shows the reporting thresholds for the TRI PBTs. The table also shows that only seven of the 20 PBTs were reported as released, transferred, or managed by facilities in Virginia for reporting year 2006. Appendix I has facility-specific information for PBT chemicals. Appendix J has general health and environmental information about the seven PBTs reported for the 2006 Virginia TRI Report.

**Table 2. TRI Reporting Year 2006 Persistent Bioaccumulative Toxic (PBT) Chemicals - Reporting Thresholds and Number of Reports Received**

CAS Number	Chemical /Chemical Category Name	Reporting threshold	Reports received
309-00-2	Aldrin	100 lbs.	0
191-24-2	Benzo(g,h,i)perylene	10 lbs.	<b>35</b>
57-74-9	Chlordane	10 lbs.	0
N150	Dioxin and Dioxin-Like Compounds	0.1 gram	<b>33</b>
76-44-8	Heptachlor	10 lbs.	0
118-74-1	Hexachlorobenzene	10 lbs.	0
465-73-6	Isodrin	10 lbs.	0
7439-92-1	Lead	100 lbs.	<b>83</b>
N420	Lead Compounds	100 lbs.	<b>101</b>
7439-97-6	Mercury	10 lbs.	<b>7</b>
N458	Mercury Compounds	10 lbs.	<b>34</b>
72-43-5	Methoxychlor	100 lbs.	0
29082-74-4	Octochlorostyrene	10 lbs.	0
40487-42-1	Pendimethalin	100 lbs.	0
608-93-5	Pentachlorobenzene	10 lbs.	0
1336-36-3	Polychlorinated biphenyls (PCBs)	10 lbs.	0
N590	Polycyclic aromatic compounds (PACs)	100 lbs.	<b>43</b>
79-94-7	Tetrabromobisphenol A (TBBPA)	100 lbs.	0
8001-35-2	Toxaphene	10 lbs.	0
1582-09-8	Trifluralin	100 lbs.	0

Table 3 provides an overview and summary of 2006 PBT data. The data is organized as in Table 1, Chapter 1. In order to avoid duplicate counting, data extracted and re-aggregated in Section 8 from Sections 5 and 6 of Form R have not been included as "On-Site Management" in Table 3.

**Table 3. Summary of Data by Type of Release, Transfer, and On-Site Management for PBT Chemicals** (Dioxin and dioxin-like compounds are listed separately from the "Other PBT Chemicals" column because they were reported in grams, while the other PBT chemicals were reported in pounds. A conversion to pounds is shown in parentheses.

ON-SITE RELEASES BY MEDIA (Section 5 of Form R)	Dioxin and dioxin-like compounds* (amounts for the year)	Other PBT chemicals (amounts for the year)
Total Air	16.18 g (0.0356 lbs.)	25,967.44 lbs.
Fugitive Air	0.1942 g (0.0004 lbs.)	5,960.42 lbs.
Stack Air	15.9859 g (0.0352 lbs.)	20,007.02 lbs.
Water	1.66 g (0.0037 lbs.)	2,804.13 lbs.
Land	1.48 g (0.0032 lbs.)	360,381.50 lbs.
<b>Total On-Site Releases to Media</b>	<b>19.22 g (0.0423 lbs.)</b>	<b>389,153.07 lbs.</b>

OFF-SITE TRANSFERS BY TYPE (Section 6 of Form R)		
Publicly Owned Treatment Works (POTWs) (includes metals and metal compounds)	1.33 g (0.0029 lbs.)	686.12 lbs.
Total Other Off-Site Transfers	18.00 g (0.0396 lbs.)	3,111,709.10 lbs.
Off-Site Transfers for Recycling	0 g (0 lbs.)	2,536,278.60 lbs.
Off-Site Transfers for Energy Recovery	0 g (0 lbs.)	1,330.20 lbs.
Off-Site Transfers for Other Treatment	4.00 g (0.0088 lbs.)	9,174.60 lbs.
Off-Site Transfers for Disposal	14.00 g (0.0308 lbs.)	564,925.70 lbs.
<b>Total Off-Site Transfers</b>	<b>19.33 g (0.0425 lbs.)</b>	<b>3,112,395.20 lbs.</b>

ON-SITE MANAGEMENT (Section 8 of Form R)		
Treated On-Site	3.39 g (0.0075 lbs.)	19.7 lbs.
Recycled On-Site	0 g (0 lbs.)	5,144.48 lbs.
Energy Recovery On-Site	0 g (0 lbs.)	0.00 lbs.
<b>Total On-Site Management</b>	<b>3.39 g (0.0075 lbs.)</b>	<b>5,164.18 lbs.</b>
<b>Total PBT Chemicals Released On-site, Transferred Off-site, and Managed On-site by Reporting Facilities</b>	<b>41.94 g (0.0923 lbs.)</b>	<b>3,506,712.45 lbs.</b>

\* Facilities are allowed to report PBT chemicals up to 7 decimal places accuracy. For presentation purposes the summary amounts in this table have been rounded; however, the integrity of facility reported data has been maintained in the database. The specific data that was reported by each facility is provided in Appendix I.

Comparing Table 3 (PBT information) to Table 1 (information on all TRI chemicals), the amount of reported PBTs released on-site (389,153 pounds) were approximately 0.6 % of the total TRI chemicals released on-site to the environment. The reported PBTs managed on-site (5,164.18 pounds) were less than one percent (0.001%) of the total TRI chemicals managed on-site. The reported PBTs transferred off-site for treatment, recycling, energy recovery, or disposal (3,112,395 pounds) were approximately 4.5% of the total TRI chemicals transferred off-site. In reporting year 2005, the on-site releases of PBT contributed to 0.4% of the total releases, 0.03% of on-site management, and 2.1% of off-site transfers.

Information on the amounts of each individual chemical/chemical category released on-site, transferred off-site, and managed on-site for the seven PBT chemicals reported by Virginia facilities is provided in Table 4.

**Table 4. Reporting Year 2006 Amounts of TRI PBT Chemicals released on-site, transferred off-site, and managed on-site by PBT** (Dioxin and Dioxin-like compounds have been converted to pounds and included in the totals)

<b>Chemical Name</b>	<b>Released On-Site (in pounds)</b>	<b>Transferred Off-Site (in pounds)</b>	<b>Managed On-Site (in pounds)</b>
Benzo(g,h,i)perylene	269.85	42.06	2.20
Dioxin and Dioxin-Like Compounds	0.04	0.04	0.01
Lead	13,967.05	576,079.59	4,965.64
Lead Compounds	361,612.17	2,500,115.30	165.14
Mercury	8.64	20,250.50	0.00
Mercury Compounds	2,958.79	325.22	0.00
Polycyclic aromatic compounds (PACs)	10,336.61	15,582.53	31.20
<b>Total for all 7 chemical/categories</b>	<b>389,153.15</b>	<b>3,112,395.24</b>	<b>5,164.19</b>

Of the PBTs listed in Table 4, lead and lead compounds, polycyclic aromatic compounds (PACs), and mercury and mercury compounds contributed most to the on-site releases to the environment, off-site transfers, and on-site management of PBT chemicals. Lead and lead compounds contributed to the bulk (96.1%) of the PBT on-site releases. Referring back to Figures 5 in Chapter 1, lead and lead compounds ranked fifth in chemicals released on site to land in Virginia. Releases of lead and lead compounds and mercury and mercury compounds to the air (via stacks) or to the land (through fly ash disposal) can result from coal or oil combustion. PACs may form as a result of incomplete combustion of coal or oil or as a by-product of other industrial processes. PACs found in the waste stream can contain adequate BTUs for energy recovery from incinerated waste.

Table 5 data show the distribution of PBTs versus reported activities (manufacture, process, or otherwise use). These three threshold activities are defined in the Glossary of Terms (Appendix B). A facility may report more than one type of activity for a single TRI chemical.

**Table 5. Activities and Uses of PBT chemicals at facilities** (from Section 3 of the Form R) for 2006

Chemical Name	Activities Reported						
	manufacturing only	processing only	otherwise use only	both manufacturing & processing	both manufacturing & otherwise use	both processing & otherwise use	manufacturing & processing & otherwise use
Benzo(g,h,i)perylene	24	19	18	5	12	2	2
Dioxin and Dioxin-Like Compounds	33	3	1	3	1	1	1
Lead	17	46	23	13	15	9	3
Lead Compounds	56	34	51	21	39	22	13
Mercury	1	6	3	1	1	2	1
Mercury Compounds	30	17	23	15	20	13	12
Polycyclic aromatic compounds (PACs)	22	14	20	10	14	3	1
Total for all 7 chemical/categories	183	139	139	68	102	52	33

Table 5 shows that “manufacturing only” was the most frequently reported activity (183) involving PBT chemicals. Manufacturing was followed by “otherwise use” (139), and “processing only” (139). The major industrial sectors that reported processing of lead or lead compounds were the furniture and fixture industries; stone, clay, glass, and concrete products industries; primary metal and fabricated metal products industries; electronic or electrical equipment manufacturers; petroleum bulk plant operators; and manufacturer of transportation equipment. Dioxin and dioxin-like compounds are normally a product of incomplete combustion of waste stream containing chlorinated products. Lead or lead compounds can be co-manufactured under chemical manufacturing processes or as a by-product of fuel (coal or fuel oil) combustion. Industries such as primary metal; stone, clay, and glass products; transportation equipment manufacturers; electric power generation facilities; solvent recovery facilities; and paper and allied products industries were key reporters of lead compounds and mercury compounds in all three (manufacturing, processing, and otherwise used) activities.

## **Chapter Three – Industrial Sectors, Facilities, and Jurisdictions**

In this chapter, data is presented by industrial sectors, as identified by the primary North American Industry Classification System Code (Part One), facilities (Part Two), and facility locations (Part Three). The chapter identifies the top ten Virginia industrial sectors, facilities, and facility locations (jurisdictions) based on the reported on-site releases and the total on-site management of TRI chemicals.

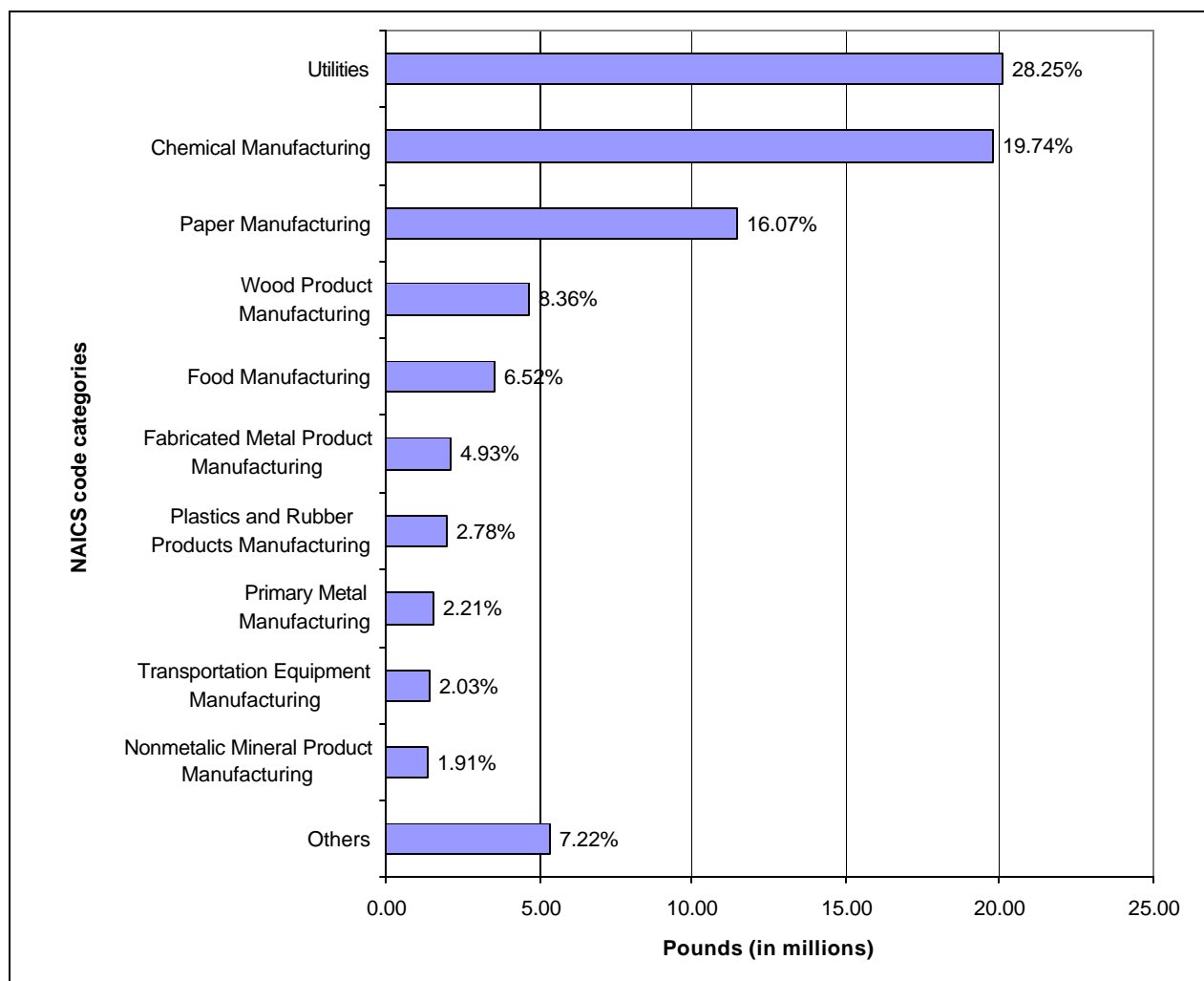
As with Table 1 (Chapter 1) and Table 3 (Chapter 2), in order to avoid double counting, the data in this chapter for on-site management do not include the data extracted and re-aggregated from Sections 5 and 6 of Form R. Complete rankings of industrial sectors, facilities, and jurisdictions are included in Appendices K, L, and M.

### **Part One - Industrial Sectors**

#### **Industrial Sectors Reporting On-Site Releases of TRI Chemicals**

Twenty-six (26) industrial sectors, including federal facilities, are subject to TRI reporting requirements (see Appendix E). The three industrial sectors reporting the most on-site releases of TRI chemicals for 2006, based on the primary North American Industrial Classification System (NAIC) Code, were: utilities (electric, gas, and sanitary services); chemical manufacturing; and paper manufacturing. These three sectors contributed to 64.1% of the total on-site releases to the environment. The remaining industrial sectors for 2006 were: wood product manufacturing, food manufacturing, fabricated metal product manufacturing, plastics and rubber manufacturing, primary metal manufacturing, transportation equipment manufacturing, and nonmetallic mineral product manufacturing. A complete ranking of industrial sectors reporting on-site TRI releases is provided in Appendix K-1.

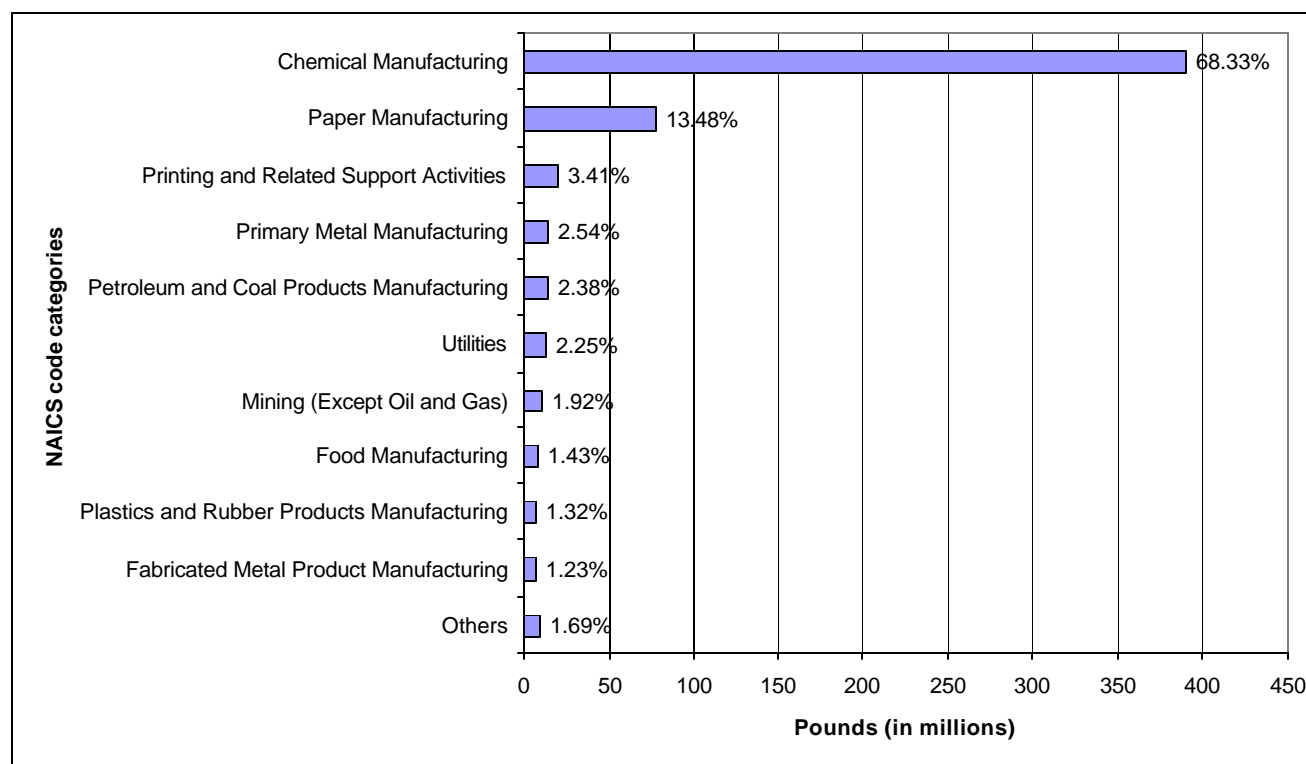
**Figure 10. Top 10 Reporting Industrial Sectors (based on NAICS codes) Releasing TRI Chemicals On-Site in Virginia for 2006** (from Section 5 of the Form R. The number next to each bar is the % of total on-site releases for all 2006 chemicals reported.)



### Industrial Sectors Reporting On-Site Management of TRI Chemicals

The three industrial sectors reporting the most on-site management of TRI chemicals (see figure 11) for 2006 based on the primary North American Industrial Classification System (NAICS) Code, were: chemical manufacturing, paper manufacturing, and printing and related activities. These three sectors contributed to 85.2% of the total of on-site management of TRI chemicals. The remaining top ten industrial sectors for 2006 were: primary metal manufacturing, petroleum and coal products, utilities, mining, food manufacturing, plastics and rubber manufacturing, and fabricated metal product manufacturing. A complete ranking of industrial sectors reporting on-site TRI management is provided in Appendix K-2.

**Figure 11. Top 10 Reporting Industrial Sectors (based on NAICS codes) Managing TRI Chemicals On-Site in Virginia for 2006** (from Section 8 of the Form R. The number next to each bar is the % of total of on-site management for all 2006 chemicals reported. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



## Facilities Reporting On-Site Releases of TRI Chemicals

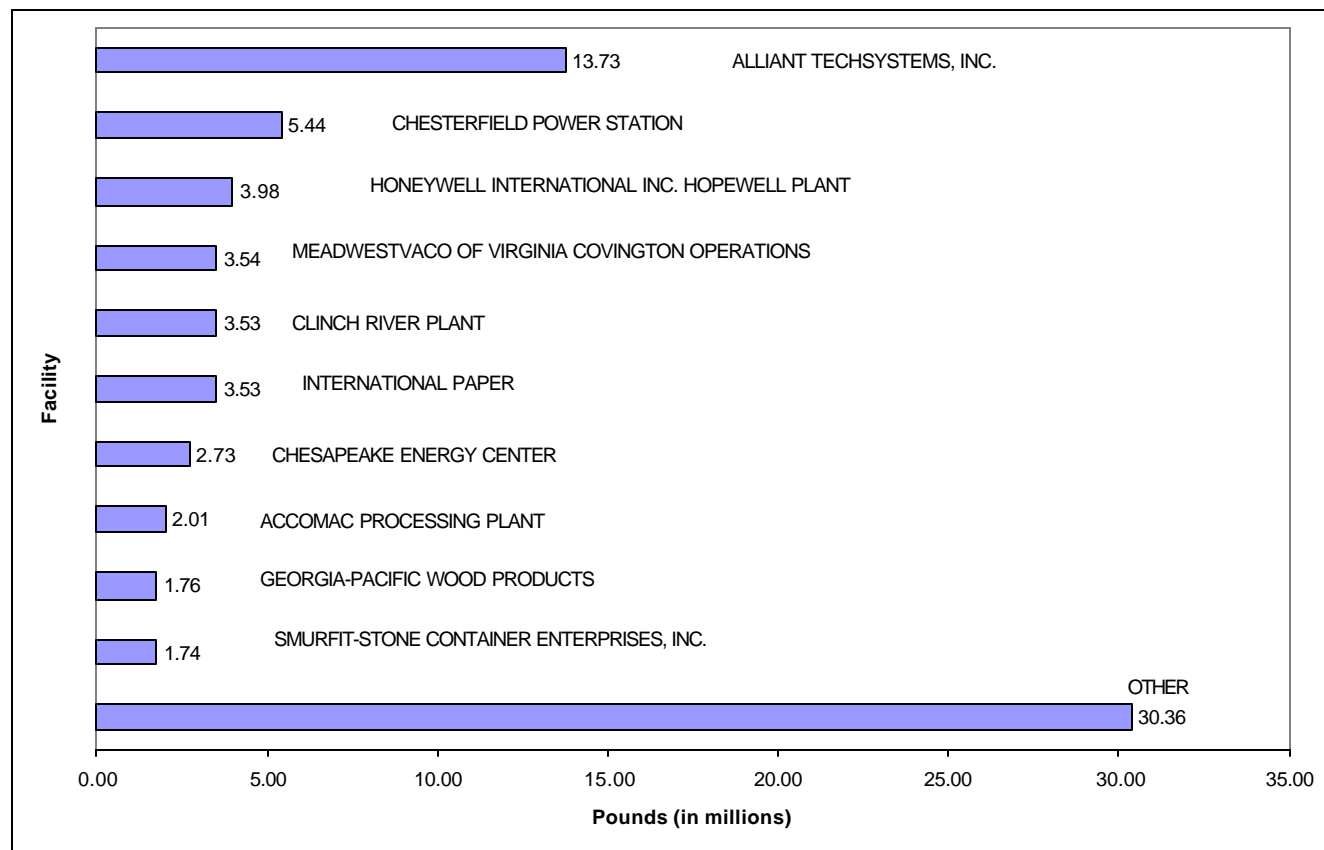
Virginia facilities that reported the highest contributions to the on-site release of TRI chemicals to the air (fugitive and stack), water, and land in 2006 were:

- Alliant Techsystems Inc. - Radford, Montgomery County
- Chesterfield Power Station - Chester, Chesterfield County
- Honeywell International Inc. – Hopewell
- Meadwestvaco Covington Operations – Covington
- Clinch River Plant - Cleveland, Russell County
- International Paper – Isle of Wight
- Chesapeake Energy Center – Chesapeake City
- Accomac Processing Plant – Accomack County
- Georgia-Pacific Wood Products – Campbell County
- Smurfit Stone Container Corp. – King William County

These facilities accounted for 63.4% (42.1 million pounds) of all reported TRI releases to these media for 2006. Of the ten facilities, three are utilities facilities, three are paper manufacturing; one is a chemical manufacturing facility; one is a paper and allied products facility; one food manufacturing facility; and one wood product manufacturing facility.

Figure 12 shows the quantity of TRI chemicals each of these facilities released in Virginia in 2006. See Appendix L-1 for a complete ranking of on-site releases by facility.

**Figure 12. 2006 Top Ten Virginia Facilities Reporting Releases of TRI Chemicals On-Site** (from Section 5 of the Form R. The number next to each bar is the total on-site releases (in millions of pounds) for each facility.)



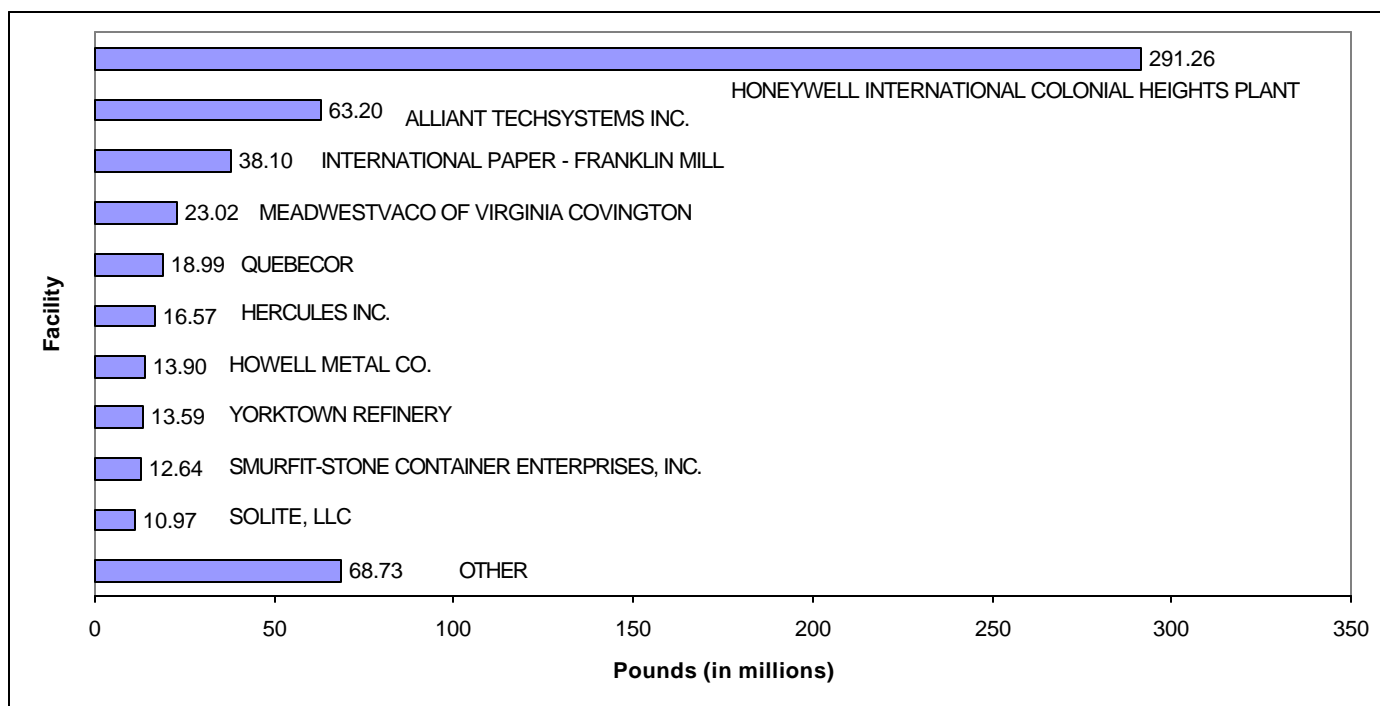
### Facilities Reporting On-Site Management of TRI Chemicals

Figure 13 shows the ten Virginia facilities reporting management of the greatest quantity of TRI chemicals on-site in 2006, other than releases. These facilities were:

- Honeywell International Colonial Heights Plant – Hopewell
- Alliant Techsystems Inc. - Montgomery County
- International Paper – Franklin, Isle of Wight County
- Meadwestvaco Covington Operations – Covington
- Quebecor World Richmond, Inc. – Henrico County
- Hercules Incorporated – Prince George County
- Howell Metal Co.- New Market, Shenandoah County
- Yorktown Refinery - Grafton, York County
- Smurfit Stone Container, Inc. – King William County
- Solite Corporation – Buckingham County

These facilities accounted for approximately 79.2% (502.24 million pounds) of all reported on-site management (other than releases) in 2006. Figure 13 shows the quantity of TRI chemicals each of these facilities managed on-site in Virginia in 2006. Of the ten facilities, four are chemical manufacturing facilities; three are paper manufacturing facilities; one is a printing and related support facility; one is a petroleum and coal products manufacturing facility; and one is a primary metal manufacturing. See Appendix L-2 for a ranking of on-site management by facility.

**Figure 13: 2006 Top Ten Virginia Facilities Managing TRI Chemicals On-Site, Other than Releases** (from Section 8 of the Form R. The number next to each bar is the total on-site management (in millions of pounds) for each facility. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)

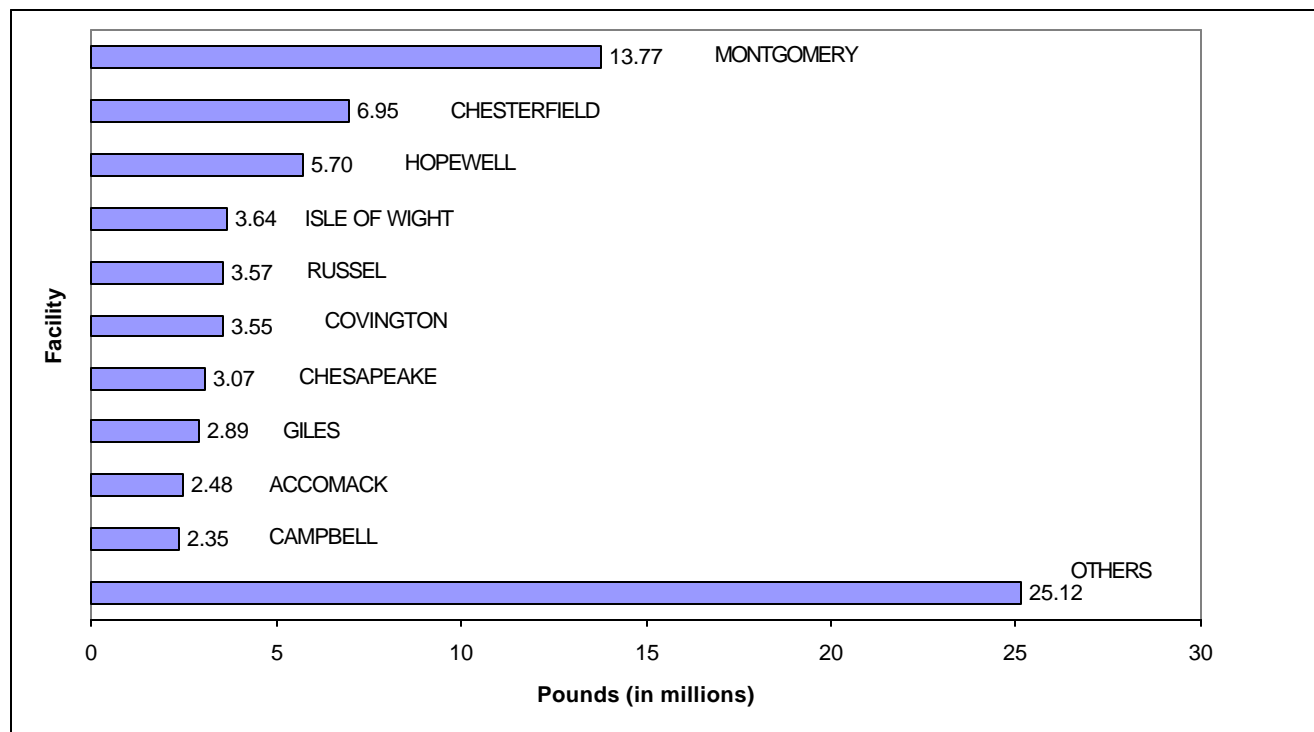


## Jurisdictions with Facilities Reporting On-Site Releases of TRI Chemicals

The Virginia jurisdictions (counties and independent cities) with facilities having the largest reported amount of total TRI chemicals released on-site to the environment (air, water, and land) in 2006 were as follows: Montgomery County, Chesterfield County; Hopewell, Isle of Wight, Russell County, Covington, Chesapeake (city), Giles County, Accomack, and Campbell County. The reported on-site releases occurring within these jurisdictions comprised 72.3% (47.9 million pounds) of the total TRI chemicals released on-site into the Virginia environment by Virginia facilities.

Appendix M-1 of this document contains a ranking of jurisdictions by the on-site releases of facilities located in each jurisdiction. Furthermore, Appendices H and I contain detailed information about facilities located in these jurisdictions.

**Figure 14. 2006 Top Ten Virginia Jurisdictions with the Largest Amount of On-Site TRI Releases Reported by Facilities** (from Section 5 of the Form R). The number next to each bar is the total on-site releases (in millions of pounds) for each jurisdiction.



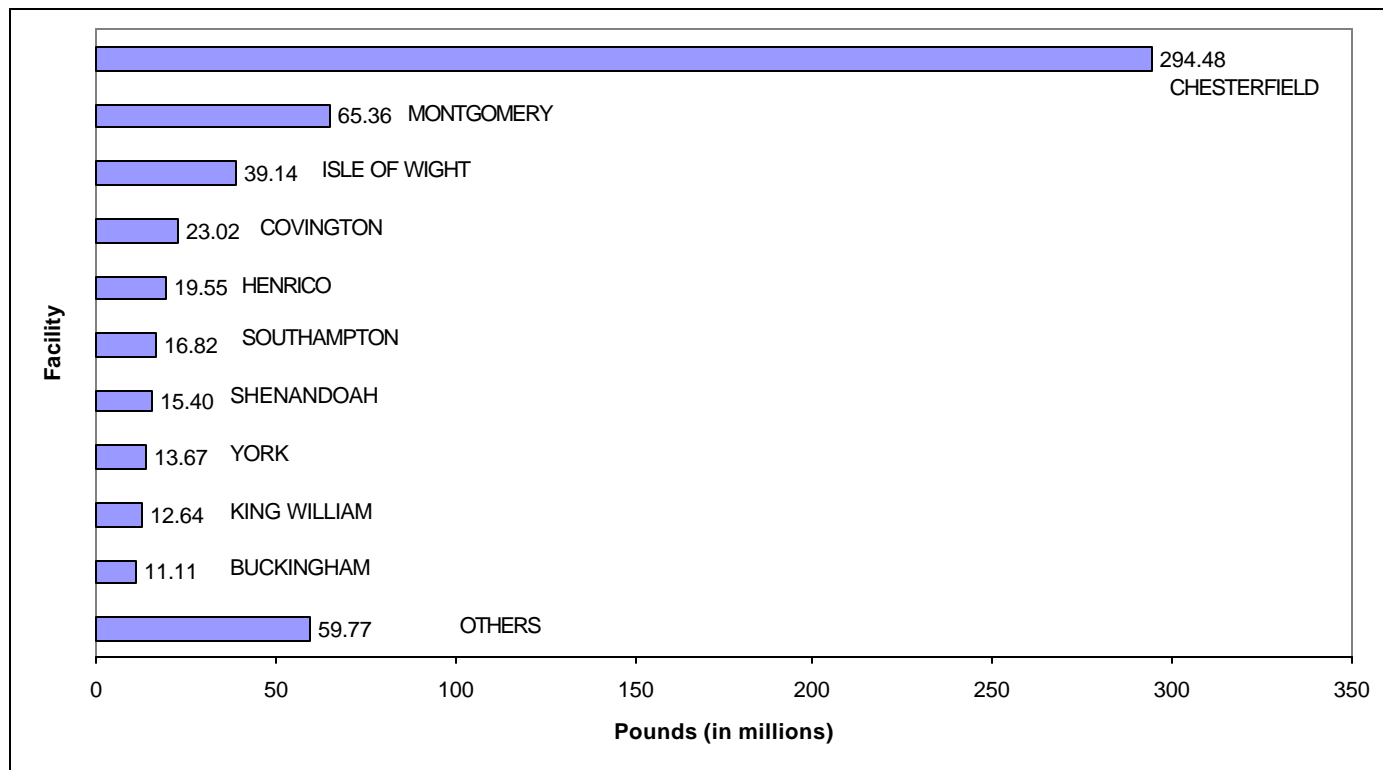
### **Jurisdictions with Facilities Reporting Other On-site Management of TRI Chemicals**

The Virginia jurisdictions with facilities having the largest amount of total reportable TRI chemicals managed on-site (other than releases) were: Chesterfield County, Montgomery County, Isle of Wight, Covington, Henrico County, Southampton County, Shenandoah, York County, King William County, and Buckingham County. The on-site management of these chemicals in these jurisdictions comprised 80.6% (511.2 million pounds) of total TRI chemicals managed on-site (other than releases) by reporting facilities in Virginia.

Appendix M-2 of this document contains a ranking of jurisdictions by the on-site management of facilities located there. Furthermore, Appendices H and I contain detailed information about facilities located in these jurisdictions.

**Figure 15. 2006 Top Ten Virginia Jurisdictions with the Largest Amount of TRI Chemicals**

**Managed On-Site as Reported by Facilities:** (from Section 8 of the Form R. The number next to each bar is the total on-site management (in millions of pounds) for each jurisdiction. This figure does not include the data extracted and re-aggregated from Sections 5 and 6 of Form R.)



## **Chapter Four – Virginia TRI Historical Comparison**

Since its inception, the TRI program has been expanding and evolving, providing more information to the public about the presence and release of toxic and hazardous chemicals in communities. Over the past 20 years, various regulatory changes have occurred (see Appendix D). In addition, facilities are authorized to revise reports from previous years. This makes direct comparison of current data to historical reports difficult and potentially misleading. Appendix G provides further information about the changes in reporting requirements, and sets out limited historical data that have been standardized.<sup>3</sup>

Nevertheless, reporting years 2004, 2005, and 2006 are generally comparable, and Chapter Four presents data for those three years. All revisions for those reporting years received on or before February 21, 2008 have been incorporated into this chapter. It should be noted, however, that beginning with reporting year 2001, lead and lead compounds were re-designated as PBT chemicals, and the threshold for reporting was reduced to 100 pounds. This caused facilities to submit significantly more reports for lead and lead compounds for reporting years 2001 through 2006.

Table 6 compares TRI data for reporting years 2004 to 2006 by type of release, transfer, and on-site management.

For reporting year 2006, the total amount of on-site releases shows an increase from the corresponding amount for reporting year 2005; off-site transfers decreased and on-site management increased from the corresponding amount for reporting year 2005. From 2005 to 2006 the total TRI chemicals released on-site, transferred off-site, or managed on-site increased by 29.4%.

The most noticeable change seen for the on-site releases in this table is a 45.2% decrease in fugitive air. There was an overall increase of 18.6 % for on-site releases from 2005 to 2006. This is attributed to a very high reported value for water release activities by one facility compared to previous reporting.

Table 6 also shows that the management of TRI chemicals through treatment, recycling, or energy recovery increased in 2006. Most notable for the 2006 reporting were the significant increases in the energy recovery on-site. The overall quantities of TRI chemicals managed on-site increased by 40.4% for 2006.

The overall quantities of TRI chemicals transferred off-site for further management or disposal decreased by 20.8%.

Longer term trends can be seen in the last column of Table 6. Over the three years, on-site releases of TRI chemicals increased 6.3%, off-site transfers increased by 7.8%, and on-site management increased by 141.9%. Over the three years 2004 through 2006, Virginia facilities reported a 98.0% increase in the release, transfer, or other management of TRI chemicals.

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<sup>3</sup> The information in Appendix G is historical and is for general comparison only.  
*Virginia TRI Report – Summary of Data*  
*from 2006 Facility Reports (issued March 2008)*

**Table 6. Comparison. Summary Data by Type of Release, Transfer, and On-Site Management for TRI Chemicals for 2004, 2005, and 2006**

MANAGEMENT ACTIVITIES	YR 2004 (POUNDS)	YR 2005 (POUNDS)	YR2006 (POUNDS)	changes 2005- 2006	% change 2005-2006	%change 2004-2006
<b>ON-SITE RELEASES</b>						
AIR (TOTAL)	48,124,542.7	41,167,066.5	41,953,491.00	786,424.5	1.91%	-12.82%
FUGITIVE AIR	5,214,850.3	6,859,359.3	3,760,852.00	-3,098,507.3	-45.17%	-27.88%
STACK AIR	42,909,692.5	34,307,707.2	38,192,639.00	3,884,931.8	11.32%	-10.99%
WATER (*)	8,681,965.9	9,880,733.2	19,458,570.00	9,577,836.8	96.93%	124.13%
LAND	5,612,934.2	4,865,708.1	4,913,971.00	48,262.9	0.99%	-12.45%
<b>TOTAL</b>	<b>62,419,442.8</b>	<b>55,913,507.8</b>	<b>66,326,032.00</b>	<b>10,412,524.2</b>	<b>18.62%</b>	<b>6.26%</b>
<b>OFF-SITE TRANSFERS</b>						
POTW	15,616,651.0	19,008,319.5	11,824,256.00	-7,184,063.5	-37.79%	-24.28%
OTHER OFF-SITE TRANSFERS	48,390,602.6	68,120,978.3	57,185,726.00	-10,935,252.3	-16.05%	18.18%
RECYCLING	22,708,021.7	27,214,036.6	24,311,600.00	-2,902,436.6	-10.67%	7.06%
ENERGY RECOVERY	14,159,014.5	11,261,008.0	11,641,578.00	380,570.0	3.38%	-17.78%
OTHER TREATMENT	1,809,789.6	20,847,052.1	12,864,538.00	-7,982,514.1	-38.29%	610.83%
DISPOSAL	9,713,776.8	8,798,881.6	8,368,010.00	-430,871.6	-4.90%	-13.85%
<b>TOTAL</b>	<b>64,007,253.6</b>	<b>87,129,297.8</b>	<b>69,009,982.00</b>	<b>-18,119,315.8</b>	<b>-20.80%</b>	<b>7.82%</b>
<b>ON-SITE MANAGEMENT</b>						
TREATED ON-SITE	152,447,211.0	89,899,954.5	167,777,050.00	77,877,095.5	86.63%	10.06%
RECYCLED ON-SITE (*)	93,879,346.9	350,104,742.6	441,619,821.00	91,515,078.4	26.14%	370.41%
ENERGY RECOVERY ON-SITE	15,832,947.4	11,634,228.5	24,771,860.00	13,137,631.5	112.92%	56.46%
<b>TOTAL</b>	<b>262,159,505.3</b>	<b>451,638,925.6</b>	<b>634,168,731.00</b>	<b>182,529,805.5</b>	<b>40.41%</b>	<b>141.90%</b>
<b>GRAND TOTAL</b>	<b>388,586,201.7</b>	<b>594,681,731.2</b>	<b>769,504,745.0</b>	<b>174,823,013.8</b>	<b>29.40%</b>	<b>98.03%</b>

\* Please note this includes a very high value reported for RY2006 for one of the facilities as compared to previous years reporting due to recalculation of facility activities.

Table 7 compares, in detail, the TRI data for PBT chemicals by type of release, transfer, and on-site management for reporting years 2004 to 2006. From 2004 to 2006, the total of PBT chemicals released on-site, transferred off site, or managed on-site increased by 66.3%.

The most notable change for the 2006 reporting was the increase in the on-site releases of PBT chemicals. Also there was an increase in the usage of off-site transfer facilities for recycling, energy recovery, and disposal options, as compared to 2005 data. In particular there was a significant increase in off-site transfers for recycling. Table 7 also shows a major decrease in on-site management as compared to previous reporting years.

**Table 7. Comparison Summary Data by Type of Release, Transfer, and On-site Management for PBT chemicals for 2004 and 2006 (from Table 1)**

MANAGEMENT ACTIVITIES	YR 2004 (POUNDS)	YR 2005 (POUNDS)	YR2006 (POUNDS)	changes 2005- 2006	% change 2005-2006	%change 2004-2006
<b>ON-SITE RELEASES</b>						
AIR (TOTAL)	29,686.0	29,046.0	25,967.44	-3,078.6	-10.60%	-12.53%
FUGITIVE AIR	6,980.0	9,135.6	5,960.42	-3,175.2	-34.76%	-14.61%
STACK AIR	22,705.0	13,745.3	20,007.02	6,261.7	45.55%	-11.88%
WATER	2,625.0	1,923.0	2,804.13	881.1	45.82%	6.82%
LAND	275,459.0	187,225.0	360,381.50	173,156.5	92.49%	30.83%
<b>TOTAL</b>	<b>307,770.0</b>	<b>218,194.0</b>	<b>389,153.07</b>	<b>170,959.1</b>	<b>78.35%</b>	<b>26.44%</b>
<b>OFF-SITE TRANSFERS</b>						
POTW	678.0	587.0	686.12	99.1	16.89%	1.20%
OTHER OFF-SITE TRANSFERS	1,776,242.0	1,548,011.0	3,111,709.10	1,563,698.1	101.01%	75.18%
RECYCLING	1,155,493.0	969,021.0	2,536,278.60	1,567,257.6	161.74%	119.50%
ENERGY RECOVERY	1,296.0	984.0	1,330.20	346.2	35.18%	2.64%
OTHER TREATMENT	14,909.0	19,609.0	9,174.60	-10,434.4	-53.21%	-38.46%
DISPOSAL	603,848.0	560,397.0	564,925.70	4,528.7	0.81%	-6.45%
<b>TOTAL</b>	<b>1,776,920.0</b>	<b>1,548,598.0</b>	<b>3,112,395.22</b>	<b>1,563,797.2</b>	<b>100.98%</b>	<b>75.16%</b>
<b>ON-SITE MANAGEMENT</b>						
TREATED ON-SITE	18.0	5.0	19.70	14.7	294.00%	9.44%
RECYCLED ON-SITE	23,805.0	112,509.0	5,144.48	-107,364.5	-95.43%	-78.39%
ENERGY RECOVERY ON-SITE	311.0	0.0	0.00	0.0	0.00%	-100.00%
<b>TOTAL</b>	<b>24,134.0</b>	<b>112,514.0</b>	<b>5,164.18</b>	<b>-107,349.8</b>	<b>-95.41%</b>	<b>-78.60%</b>
<b>GRAND TOTAL</b>	<b>2,108,824.0</b>	<b>1,879,306.0</b>	<b>3,506,712.5</b>	<b>1,627,406.5</b>	<b>86.60%</b>	<b>66.29%</b>

## **Chapter Five - Conclusion**

The 2006 Virginia TRI Report is issued pursuant to Virginia Code §10.1 – 1186.1. The report has information on chemicals and chemical categories, activities involving their use, industrial sectors, facilities, and facility locations (jurisdictions). It provides historical perspective on TRI chemicals in the Commonwealth.

The report provides information concerning listed toxic chemicals and chemical categories that are manufactured, processed, or otherwise used at Virginia facilities, including amounts released to the environment, transferred off-site, and managed on-site. Industry can use the data in a variety of ways, including a measurement of progress toward reduction targets.

There are limitations on the use of TRI data, however, especially with regard to assessment of risk and the comparison of data for various years.

Since 1988, the amount of TRI chemicals released or otherwise managed has historically decreased. The data for reporting year 2006 shows an increase in the amount of TRI chemicals released on-site; however, they indicate a decrease in off-site transfers and increase in on-site management based on the latest reports and revisions. At this time, it is not possible to predict with confidence whether these trends will continue.